WESTERN GAS

DEC 14 1934

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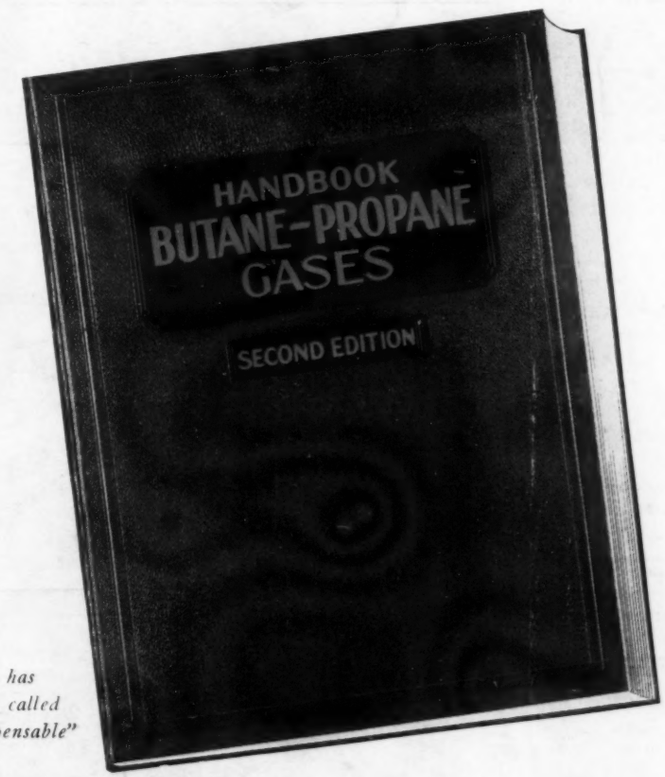

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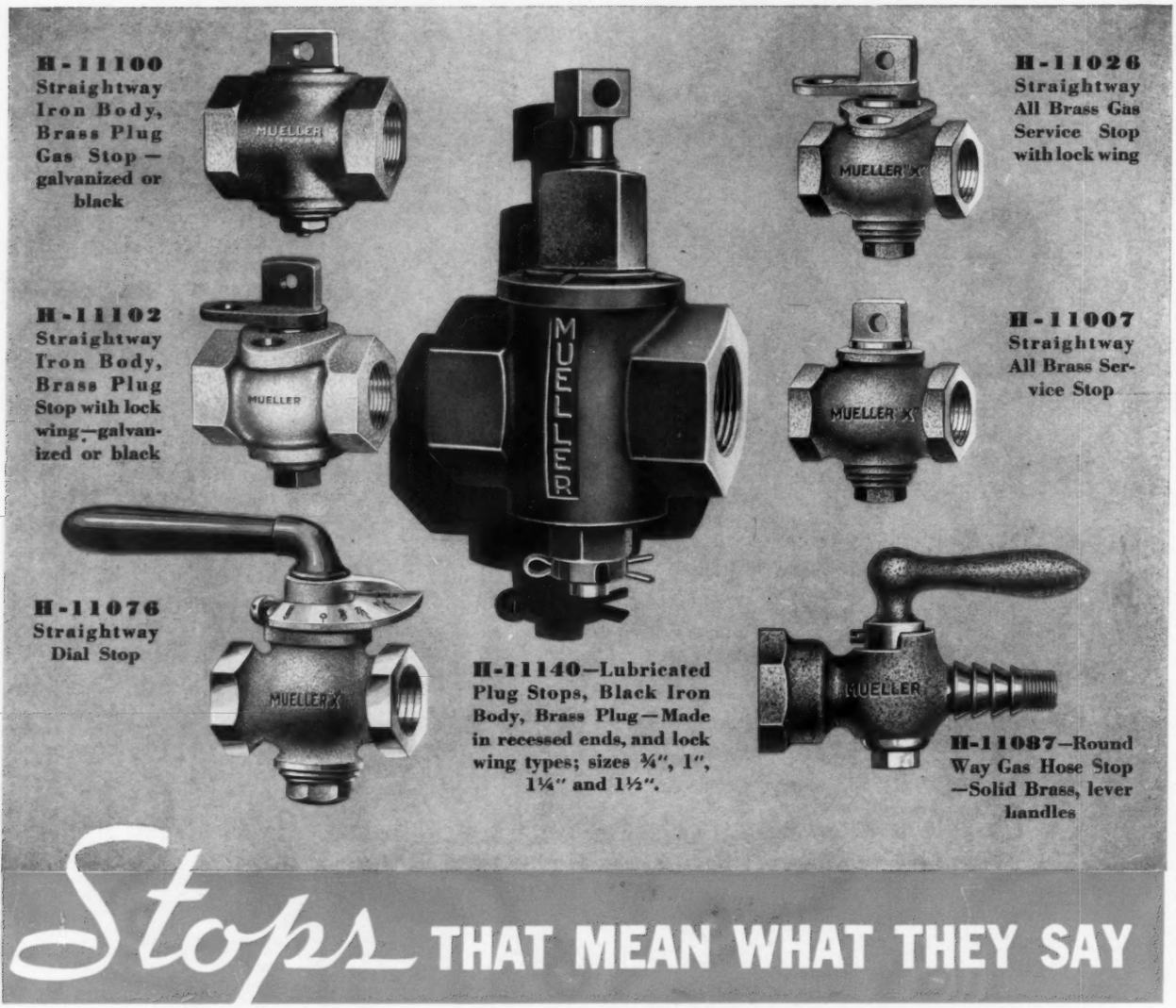
SEE PAGE 39 FOR DETAILED INFORMATION

December 1934 ♦ ♦ 25 Cents


H-11100
Straightway Iron Body, Brass Plug Gas Stop — galvanized or black
H-11102
Straightway Iron Body, Brass Plug Stop with lock wing—galvanized or black
H-11076
Straightway Dial Stop
H-11140—Lubricated Plug Stops, Black Iron Body, Brass Plug—Made in recessed ends, and lock wing types; sizes ¾", 1", 1¼" and 1½".
H-11026
Straightway All Brass Gas Service Stop with lock wing
H-11007
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Stops THAT MEAN WHAT THEY SAY

Of all equipment made in Mueller plants, nothing is so simple in form as ground plug stops—or so difficult to manufacture! To manufacture stops that mean what they say, even when subjected to the high air pressure tests submerged in liquid, calls for a degree of precision that is found in few manufactured products.

As one of the oldest and largest manufacturers of this class of equipment, Mueller Company has developed elaborate facilities for achieving this precision that means so much to your business and our business. The methods include laboratory control of materials, special machinery for machining plugs and grinding them into the bodies—to mirror smoothness and microscopic contact throughout the entire tapered section.

This care is reflected in the record of Mueller Brass Goods. It explains why *all* Mueller Stops work right year in and year out—under all service conditions.

A number of typical Gas Stops are illustrated above—but they are only a small part of the wide range of types and patterns illustrated in Section 3 of your Mueller Gas Catalog H.

MUELLER CO., Decatur, Ill.

Factories: **Decatur, Ill., Chattanooga, Tenn., Los Angeles, Calif., Sarnia, Ont.**
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MUELLER

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Lock Wing
Mzter Stops
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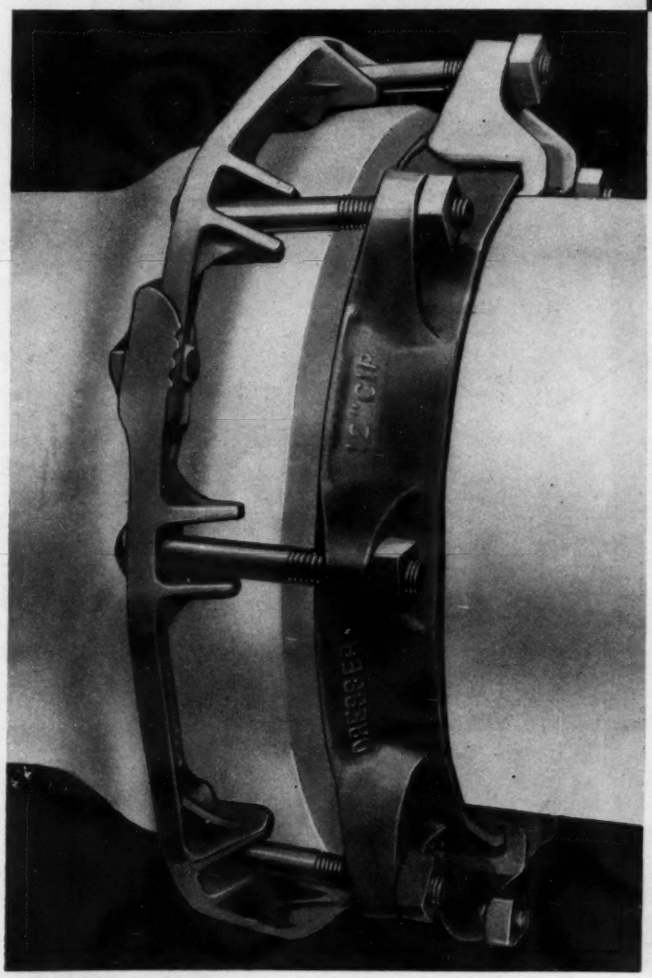
Stove Stops
Dial or Indicator Stops
Hose Stops
Lubricated Plug Stops

HIGH GASKET PRESSURES *Assured*

by these 6 features



1. ADJUSTABLE FOLLOWER RING WITH UNIFORM STRENGTH AND RIGIDITY
2. CONTINUOUS GASKET RECESS WITH FOLLOWER RING ADJUSTABILITY
3. RADIAL CONFORMABILITY WITH AXIAL STRENGTH AND STIFFNESS
4. ADJUSTABLE ANCHOR RING WITH INTERLOCKING SECTION JOINTS
5. EXCLUSIVE TIME-PROVED OIL-RESISTING GASKET
6. SELF-ALIGNING FOLLOWER-RING BOLT HOLES . . .

ONLY the Dresser Style 60 combines these 6 features . . . ONLY the Dresser Style 60 is Sealometer developed and proved! . . .

S. R. DRESSER MANUFACTURING COMPANY • BRADFORD, PA.

In Canada: Dresser Manufacturing Company, Ltd., 32 Front Street, W., Toronto, Ontario

DRESSER

BELL JOINT CLAMPS

December, 1934. Volume X, Number 12. Western Gas is published by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance) 25 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

Reproduction of the micrograph above shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent, they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.

For pipe of large diameter, The Barrett Company will furnish equipment required to revolve pipe and spread enamel.

MAXIMUM PROTECTION at Lowest Cost Per Year . . .

Barrett Pipe Line Enamels successfully resist the destructive action of water, soil acids, alkalis, stray electric currents, and other corrosive agencies.

Barrett application specifications, developed through years of field experience, provide rules for correct field applications.

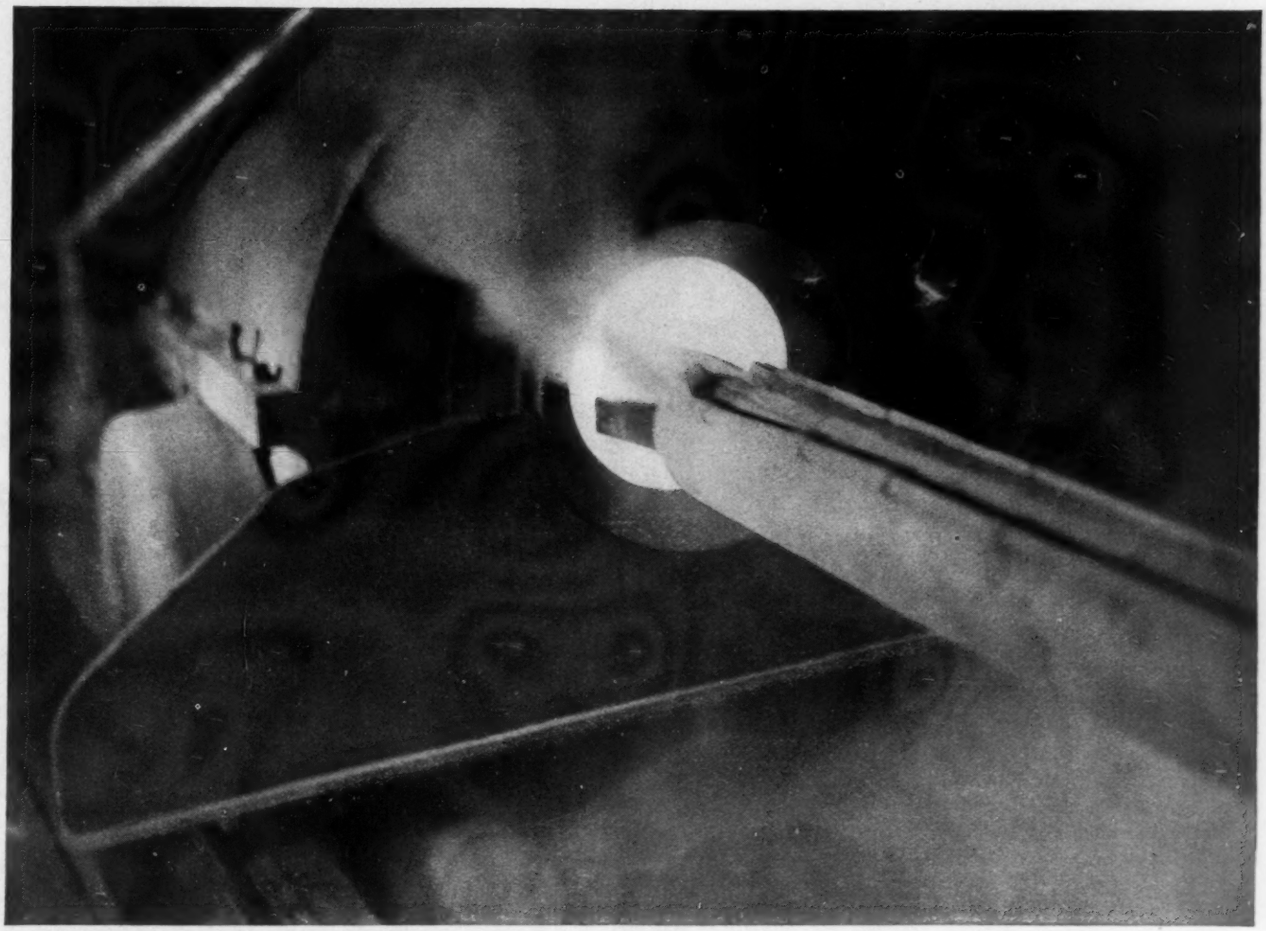
The combination—Barrett Pipe Line Enamels applied according to Barrett Application Specifications—is designed to meet all service conditions and assure maximum protection at the lowest cost per year. Phone, write or wire for information.

THE BARRETT COMPANY, 40 RECTOR STREET, NEW YORK, N.Y.

Barrett Specification

PIPE LINE ENAMELS

impact strength DOUBLED



The experience of users for the past twenty months has confirmed in the field what a long succession of tests has consistently proved, namely, that Super-de Lavaud Pipe is endowed with extraordinary resistance to shocks encountered in handling, transportation and service. The impact strength of this pipe is more than double that of the centrifugal pipe we formerly produced. Users also report pronounced increases in toughness as well as ductility. Tests show more than 50% increase in elongation and notably greater ductility without loss of tensile or bursting strength. These important advantages are the result of a new technique in the centrifugal casting of gray iron, developed and patented by this company, whereby Super-de Lavaud Pipe is cast without chill in a metal mold. *Seven million feet of this pipe have been sold in 20 months.* Send for booklet.

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BURLINGTON, N. J.
Foundries and Sales Offices throughout the United States

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CENTRIFUGALLY CAST WITHOUT CHILL IN A METAL MOLD

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Performance records are a good reason why this customer, like many others, continues to buy *everything for pipe line welding and cutting from Linde.* All Linde customers are entitled to the full cooperation of Linde Process Service.

Linde Process Service can help you, also, to organize pipe line welding and cutting operations for greater speed, dependability and profit. Linde's experience with the special job of reclaiming and relaying old pipe lines has been extensive and thorough. If you have a job of this special nature, you should avail yourself of Linde's store of profitable data and time-saving developments.

Ask the nearest Linde Sales Office to show you without obligation how Linde can be of help to you on all your pipe line construction operations.

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THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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WESTERN GAS

"Reg. U. S. Pat. Off."

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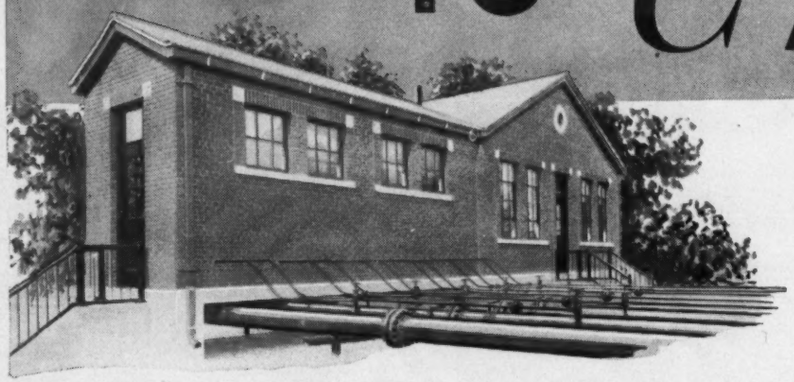
MEASURING GAS TO *Chicago*



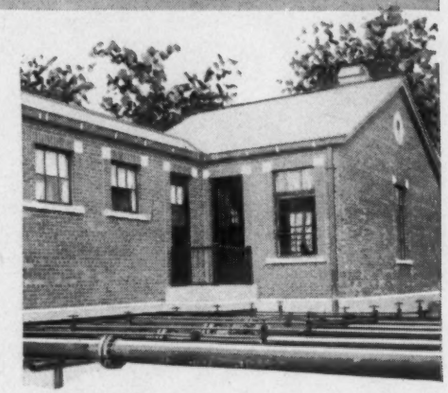
● 50 to 150 million cubic feet of natural gas per day are measured by these two stations, through which pass Chicago's natural gas supply.

The gas is measured by 12 Westcott orifice meters . . . 6 in each station . . . with a difference in measurement between the two sets of instruments during 1933 of LESS THAN .1 OF 1 PER CENT . . . an exceptionally fine check for large volume measurement of gas, air, steam or liquids.

After leaving the six 10-inch runs of the first station the gas is assembled in a header and carried through a single 24-inch line to the header and six 10-inch runs of the second station. American Meter orifice instruments owe this extraordinary accuracy to their development and production under the same conditions as American meters measuring volumes as minute as the gas pilot light's flow.

Millions of these high and low pressure meters in service are virtually the cash registers of the gas utility companies. They MUST be accurate.

Bulletins describing the application of American orifice meters . . . indicating, recording and integrating . . . will be mailed to you on request.



AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

METRIC METAL WORKS • ERIE, PENNSYLVANIA

232

December, 1934

WESTERN GAS

"Reg.U. S. Pat. Off."

Vol. X, No. 12

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

Utilities Ready to Fight Back

EVENTS of last month bring hope to those who have been demanding a less passive attitude of the utilities, on the government-in-the-power-business issue. It has taken two years to convince the utility industry that the federal trend is definitely socialistic, at least so far as concerns the electric industry. Now, apparently, we are to see action.

Edison Electric Institute's directors have authorized the Institute to embark on a constitutional test of the government's T.V.A. activities. Based on a legal opinion prepared by Newton D. Baker and James M. Beck, both constitutional law authorities of first rank, the Institute's move at last sounds a clear challenge to the public power program. Since the Institute represents at least 80 per cent of the electric industry its action is official and should usher in a definite test. It may be taken for granted that the battle will be a bitter one at all stages, for government and municipal power interests have caught a vision which they will not easily relinquish.

The electric industry declared itself late in November. Earlier in the month the gas industry gave notice of its stand in a resolution adopted with unmistakable enthusiasm at the American Gas Association convention. A.G.A. directors were specifically instructed to take measures to bring facts on the present unfair government competition to public notice, and to endeavor to secure the restriction of T.V.A. and other public programs within fair limits.

Such open declarations of policy from the industry, and the promise of early legal tests, establish a clear-cut issue around which it should be possible to marshal support for the utilities. Industry can be made to appreciate the wasteful and destructive trend of government competition. One of the strongest factors in the present situation is the coal industry's demand that the government put a stop to its competition, and other affected industries should be heard from in the same vein. Influence of protests from the coal men are already evident, say some commentators, in the recent retraction of several P.W.A. grants which had been earmarked for public power projects.

Decidedly encouraging was the ruling made in U. S. District Court at Birmingham late in November by Judge W. I. Grubb, who denied a motion by T.V.A. to dismiss a suit attacking its constitutionality. The suit, brought by 14 stockholders of Alabama Power Co., seeks to prevent transfer of various company properties to T.V.A. This ruling should bring the T.V.A. into court soon to defend constitutionality of its actions.

Load Building Is Best Defense

ONE immediate effect of the government's self-inspired program for spreading electric consumption has been beneficial, so far as concerns gas. Attention has turned, as never before, to the need for building load, and the industry is quickly developing a technique of mass selling which it has long needed.

At the A.G.A. convention a group of speakers representing companies in the T.V.A. section and adjacent areas told of aggressive methods being used to hold domestic gas load. Gas companies in these sections are facing their new competition aggressively. Rates in some cases have necessarily been revised below sound limits but no step is being neglected to hold customers and build consumption. Rental and rental purchase plans are proving effective, and general use of long term credit is being found necessary to meet the electric appliance financing of the Electric Home and Farm Authority, T.V.A. subsidiary.

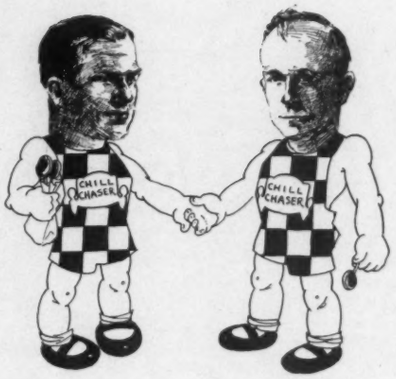
Companies in the competitive belt have doubled their sales forces, put their home service departments on the radio, conducted "old range contests," used testimonial advertising from gas customers, offered five-year guarantees on gas ranges against burned out or worn out parts, and brought out a variety of other sales weapons for use in the emergency. One conclusion from their experience is that the companies enjoying the most favored position against government competition are those which anticipate such competition and start their sales promotions early.

In the present situation there is one clear course for gas companies—to earnestly support the electric industry in its present move against the public power program, and to pursue unrelentingly every sound procedure for building gas load.

FIVE SOUTHERN

The Chill

A PAGE FROM THE dealer prospectus for the Chill Chaser Campaign. This 12-page booklet gave details of the dealer tie-in plan, featuring free extension of yard lines, employee assistance on dealer sales, newspaper advertising, special window trims for dealers, etc.



CHILL CHASER ANDERSON — CHILL CHASER GODWIN

The campaign artist catches Robt. C. Anderson, Mississippi Power & Light Co. residential and commercial sales manager, and George W. Godwin, advertising manager, in a pre-campaign pose, attired in Chill Chaser regalia.

MASS selling has supplied the solution for load-building problems in many localities during the past year or two. *Western Gas* in recent issues has reported special plans for intensified promotion of clock-controlled ranges and central heating. The present article by Mr. Godwin tells of a spectacular and effective selling effort on gas space heaters, carried on jointly by a group of companies distributing natural gas in five southern states. How this highly successful campaign provided for employee participation, temporary sales force, dealer cooperation, and the other sales essentials will be of general interest. An active committee organization which analyzed campaign goals and methods, and unified forces of the many participating companies, distinguishes the "Chill Chaser Campaign" as *"different."*

—Editor

NATURAL gas is one of the world's oldest fuels and for several generations it has been accepted by the citizens of American cities without undue excitement.

Discovery of natural gas fields in the South some 10 or 12 years ago gave to companies of this section the opportunity to dramatize the new fuel as compared with the manufactured gas that it replaced in such southern cities as Memphis, New Orleans, Atlanta and Houston. However, the introduction of natural gas in these and other southern cities took place long enough ago that the public generally has come to accept its virtues as commonplace.

During the years just prior to the depression, when expansion was the order of the day, several southern utility companies built miles upon miles of natural gas pipe lines, extending the benefits of natural gas not only to large centers but into rural territory. Each extension of service was, of course, justified at the time by engineers who estimated that so many customers would be on the lines and using natural gas in just so many years. Possibly the engineers' figures were right, but the depression was not on their slide rules and the estimated annual increase in customers failed to materialize. All the while these companies had interest to pay on their investments and were under obligations to maintain a high standard of service for the customers that did avail themselves of the new service.

Each year during the depression, as summer turned into the football season, the several companies in the mid-south section engaged in the distribution of natural gas, launched fall house heating activities featuring natural gas space heaters, conversion burners, and central heating plants. They secured some business, of course, but at the end of the winter of 1933-34, each of the companies affected found that it was still far behind the figures set by engineers as to the estimated number of customers that should have been using natural gas.

House Heating the Answer

A close analysis of the territory showed that many homes were using natural gas for cooking and water heating, but not for house heating. These surveys also disclosed the fact that hundreds of homes with one or two natural gas space heaters installed needed from one to five additional heaters in order to have heat available in all of the rooms. The delayed purchase of the additional heaters is naturally blamed upon the depression and the low purchasing ability of the public during the past several years.

Some advanced the theory that prevailing rates were holding back the use of gas for house heating, but this theory was exploded by the survey in Jackson, Mississippi. This city had manufactured gas for many years before natural gas became available in 1930. For four years the city has had a 27 cent net rate for natural gas of approximately 1000 B.t.u. for domestic use and yet there are 1500 homes in that city on existing mains that are not piped for gas. The question of rates does not seem to affect the situation, for natural gas at a 27 cent domestic rate is far cheaper than any other available fuel.

In an effort to stimulate the use of natural gas for house heating and in order to create a renewed public interest in this ideal fuel, the representatives of six gas distributing companies from the states of Tennessee, Arkansas, Mississippi, Louisiana and Texas gathered in Memphis on July 24 to discuss ways and means of developing the use of natural gas in the territories of the various companies.

The companies represented at this meeting were: Memphis Power & Light Co., Mississippi Power & Light Co., West Tennessee Power & Light Co., Arkansas Power & Light Co., and the United Gas System, distributing natural gas in five southern states.

At this meeting it was pointed out that with the general improvement in business, with the National Housing Act placing special emphasis on home betterment, it seemed the logical time to promote a wider public acceptance and appreciation of the value of natural gas for heating services, and that now was the time to build a greater saturation of gas

COMPANIES JOIN FORCES IN···

Chaser Campaign

• *By* G. W. GODWIN

Advertising Manager, Mississippi Power & Light Company, Jackson, Mississippi.

customers and larger sales of gas, especially for space heating. It was pointed out that the companies represented served some 241,000 residential and commercial gas customers and that this presented a large market for the sale of gas space heaters. The space heater was emphasized because of its low purchase price and small installation cost. In other words, it was believed that sectional heating would give the customer excellent results, particularly in the mid-south, where winters are as a rule mild.

It was felt that joint action by the companies interested would be very helpful and that purchases of heaters, as well as publicity and sales programs, could be pooled to advantage. This interchange of ideas would greatly enhance the chance for spectacular increases in sales and go far toward securing wide public attention to the story of natural gas for heating.

•

CHILL CHASER CHARIOT

This "Chill Chaser Chariot" served Mississippi Power & Light Co. during the campaign. Five "Junior Salesmen" accompanied the truck and rendered "curb service" on gas heaters for company patrons. Two of these chariots were routed on set schedule over the several towns served by the company, and local advertising announced their arrival.

Joint Company Set-up

The meeting resulted in the appointment of five committees to go into the subject and report at a meeting scheduled for New Orleans on August 3. The committees appointed, and their respective fields of operation, were as follows:

I. Material Selection, Procurement and Distribution

Relations and negotiations with manufacturers.
Purchasing procedures; ordering, stocking.
Campaign prices and terms; standards for trial installations.
Campaign equipment; transportation.
Delivery and installation practices and standards.
Service policies and procedures.

II. Budget, Data, Routines and Records

Territory and market analysis; quotas; intercompany competition.
Relations with pipe line companies.
Routines, sales forms, prospect system, daily controls.
Records and reports; performance standards; campaign budget.
Credit and accounting arrangements.
Procedure with respect to replacement sales, especially of obsolete or "cold" heaters.
Data as to heaters per family; sales and obsolescence during depression; sales of competitive equipment.

III. Selling Plans and Sales Organization

Sales organization; regular sales forces; temporary salesmen.
Selection, equipment, training, compensation of sales people.
Sales instructions, manuals, organization, dispatching, supervision.
Employee program and sales support; education; kits; compensation.
Dealer sales and relations; special terms or offers to dealers.
Home service program.

IV. Advertising and Publicity

General campaign theme and publicity; simple presentation of sales advantages.
Advertising—newspapers, direct-mail, radio.
Selection of sales appeals to be featured; such as bargain prices, convenience, flexibility, low operating cost, etc.
Display material, trims, novelties, etc.
Shows, exhibits, demonstrations.
Mass production of prospects.

V. Connection of New Customers

Market analysis, possibilities, quotas.
Yard line practices and policies.
Piping and installation procedure.
Customer deposits; amount; installment build-up.
Solicitation and signing of new customers.
Relationship of space heater and new customer sales efforts.

At the New Orleans meeting, each of the five committees submitted a complete report and it was definitely decided to inaugurate a cooperative mass selling campaign featuring the sale of natural gas space heaters. The heater selected to be featured was the Peerless No. 6245 which cost $5.75 at the factory. The price was contingent upon initial aggregate firm orders for 5,000 units. While the one heater was to be featured, naturally the mass selling campaign would include all makes and types.

The Material Selection, Procurement and Distribution Committee, after making recommendations covering purchase of the leader heater, also submitted recommendations with respect to the use of special trucks to display and demonstrate gas space heaters in every neighborhood during the campaign. After several discussions, it was agreed that:

(1) Neighborhood display of heaters was essential to high volume sales.

(2) Either trucks or special trailers could be used for the display, at the option of each company.

(3) All display heaters should have burners removed; (a) to lighten weight of truck, (b) to facilitate quick removal for temporary display in customer's home, (c) to avoid any request for immediate installation, which, incidentally, would make check of customer's credit difficult.

(4) The campaign colors should be red and yellow, as suggesting warmth.

(5) Uniforms should be created for Junior Salesmen: Use of display trucks or trailers permitted the use of special selling crews of "Junior Salesmen". All companies agreed that special selling crews should be put in uniforms, of colors and design harmonizing with other campaign publicity.

Price and Terms

The Committee made several suggestions with respect to mark-up, retail price, terms, etc. on the leader heater and the discussion brought out the following important points:

(1) A price under $10 to the customer would be a great sales help in most areas.

In some, last year's campaign set a precedent in this respect.

(2) A price of $9.95 on the leader heater would provide a mark-up of about 50 per cent on that unit over the full cost f.o.b. district storerooms (cost at factory $5.75, cost at storerooms about $6.65) to cover delivery and selling costs and carrying charge. This should be sufficient for both company and dealer on a leader model on which very large sales volume is to be secured in a short campaign.

(3) Any dealer who wanted to quote such a price ($9.95) and still get a greater mark-up or profit margin could undoubtedly secure a cheaper heater for his own feature model and thus be able to do so.

(4) A mark-up of 50 per cent, while high enough for this campaign, would still be low enough to encourage dealers to sell other models carrying higher mark-up whenever possible and thus provide a volume of business for other manufacturers than Peerless, which would induce their distributors and dealers to support the campaign aggressively.

(5) Due to the very low, special campaign price on the leader model, if sold at a price of $9.95 it would offer customers a value of about $14.50 based on normal manufacturer prices and a 100 per cent mark-up. A value of this kind should assist dealers in getting a sale volume on this and other models during the campaign period which would well justify such an offer.

(6) Maximum terms to be granted should provide full payment before the next heating year starts and should get as much of the price as possible paid up during the coming heating season. Some companies suggested as long as 12 months, others as short as 8 months. As a compromise, 9 months was agreeable to all.

(7) All were in accord that a low required down payment was best, and it was suggested that this be set at the "odd cents" of the final quoted term selling price.

(8) Offers of "free trial" should not be necessary.

In the light of the above, it was at length decided that the leader heater should be priced to customers as follows:

Term Price: $9.95, plus installation.
Cash Price: $9.00, plus installation.
Maximum Terms: 9 months, including installation cost.
Minimum Down Payment: $0.95.
Installation Cost: To be added to deferred balance without increasing number of months to complete payment beyond 9 months.

Sales Organization

The report of the Committee on Selling Plans and Sales Organization, which had been distributed to all companies several days in advance, was approved. The major points covered in the report included the following:

(1) Major executive support of the campaign of fundamental importance.

(2) The campaign would put a heavy load on all company departments, so campaign plans should be laid to secure their full cooperation.

(3) All regular salesmen, floor salespeople, and dealer contact employees should give as much time as possible to direct sales efforts during the campaign.

(4) Crews of Junior Salesmen, as discussed previously above, should be used.

(5) Employees should provide a major source of "tips" or sales prospects. In most companies, especially outside of the larger cities, employees should be allowed also to close sales but should not receive extra bonus for a sale as compared with a "tip" which results in a sale by regular sales forces.

Above is some large-space newspaper copy prepared for the Chill Chaser heater sale. At the bottom will be noted two small "teaser" ads which preceded definite campaign announcements.

(6) Dealer and dealer employee participation should be encouraged to the limit.

(7) Junior Salesmen should be hired not later than September 1, 1934, or two weeks before the campaign.

(8) Campaign equipment should include special trucks or trailers; uniforms for Junior Salesmen; samples of the leader heater equipped with strap and carrier to be carried at all times by the Junior Salesmen. The Committee on Materials would arrange for design of such strap and carrier and locate a purchase-source and price for the equipment.

(9) *Sales Training*—This committee would prepare, and issue as soon as possible, a complete suggested schedule and training course for all classes of participants in the sales campaign,—regular salesmen, floor salespeople, Junior Salesmen, employees, dealers and dealer employees. These would be full schedules and sales manuals, complete and ready for use, except as minor modifications due to differences in rates and local fundamental policies make necessary. All such material would be submitted to the Advertising Committee for final suggestions as to form after the Sales Committee had completed its draft of suggested contents.

(10) *Compensation of Junior Salesmen*—After a great deal of discussion, the following compensation basis was agreed upon for Junior Salesmen:

Salary—At rate of $60 per month (with provision for "daily" hiring where state laws make this desirable); to be paid weekly during campaign, these men being considered as temporary employees.

Bonus—To be paid on all sales of heaters, of models approved by company, which were actually *closed* by Junior Salesmen; this to apply to sales by these men out of either company or dealer stocks. Bonus to be 50c per heater sold. Bonus to be paid every two weeks.

(11) Compensation of Regular Sales People: Both floor and outside sales people should be paid according to the company's regular compensation plan for such employees.

(12) Compensation of Employees: This subject also provided much discussion, the following conclusions eventually being reached:

(a) Employees should be paid a bonus for sales or for prospects which resulted in sales.

(b) Bonus should be based on number of prospects, primarily, rather than on number of heaters sold per prospect.

(c) Prospect card, to be valid, should cover actual contact by employee with prospect and should make appointment for salesmen to call on prospect.

(d) A prospect card should be good for not over 15 days, but if sale were not closed in that time employee should be allowed to file a 10-day renewal. If not closed in that time the "prospect" would again be open to other employees.

(e) Bonus to employee should be 50c for first heater sold to any prospect plus 25c for each additional heater sold to same prospect at same time; all sales to be closed within time limits set forth above and within campaign period to count in campaign; bonus to apply on sales from either company or dealer stocks.

(13) Compensation to Dealers for Dealer Sales: Despite the lengthy airing which this question received at Memphis, it caused another long debate at New Orleans. The discussion and eventual agreements may be summarized as follows:

(Continued on Page 40)

Inducement Rates *as an* Aid *to* Load Building

By P. M. DOWNING

Vice-President and General Manager
*Pacific Gas and Electric Company**

LOAD building is a problem very close to the heart of the management of my company. We have a large investment in natural gas lines traversing the greater part of central and northern California and we are, therefore keenly interested in load building and in whatever new steps may be undertaken to accelerate consumption.

P. M. Downing

But before starting to discuss this problem I think it would be well to suggest a slight amendment to the above title. One word has been omitted and without its qualifying force, consideration of rate reduction in relation to load building seems to me to be wasted effort.

"Inducement Rates as Aid to *Profitable* Load Building" is the way this title should read. There is a vast amount of difference between devising a rate schedule which will merely encourage increased consumption of gas, and the more difficult task of building a rate structure which will offer to the consumer the lowest possible price, lead him to the maximum use of his facilities, and at the same time permit the distributor to receive a fair return in revenue for the additional service.

This is not a new problem to the utilities. It is one upon the solution of which we are constantly at work. Many inducement schedules are now in force and others doubtless will be found feasible with further improvement of appliances, betterment of the economic situation, increased density of population and other progressive developments which affect gas rates.

I am led to emphasize here the necessity of profitable load building because of the popular fallacy, which seems to gain currency by persistent repetition, that the whole troublous question of gas and electric rates could be settled offhand by the utility companies if they would only reduce the prices of the two commodities to a point low enough to induce consumption of their capacity loads. Public utility theorists and amateur rate-makers apparently are not troubled by the "profit motive" which the rest of us are compelled to retain in our book of business principles if we wish to survive.

It is axiomatic, of course, that reduction of cost to the consumer will increase consumption, but the statement cannot be allowed to rest there. Consumption will increase only within the limits of the capacity of the consumer to use the product and within his ability to use the product profitably to himself. On the other hand, rate reductions cannot proceed beyond the point where the supplying utility is unable to furnish the increased service without loss. Obviously, below that point lies eventual bankruptcy.

We are, today, in the midst of an extraordinary era of confused economic thinking. The validity of sound conclusions based upon experience is daily being challenged by untried theories and millennial visions. In the utility field the threat of a magic "yardstick" hangs over the heads of the power companies and political candidates loudly promise "cheap power" as though that much desired product were to be drawn from the wishing well.

No one has yet proposed that a similar measuring rod be applied to the sale of gas nor that the federal government undertake the merchandising of gas appliances, but neither step is outside the range of possibility. The gas industry as a whole more than ever before must be vitally concerned with the current trend of public utility thought.

A very potent argument in favor of rates with inducement features is that low rates encourage increased consumption and notwithstanding the resulting reductions in current revenues, can be justified on the theory that eventually the increased revenue from the greater use will not only offset the immediate losses, but will eventually show a very satisfactory increase in net earnings. It is sometimes argued that the distributing company can afford to take a present loss even to the point of reducing its return to its stockholders because in the end its earnings will be restored to the former level.

Such an argument can be carried to absurd lengths. Obviously, without some reasonable limitation, it sets up a vicious circle which in the end would reduce utility earnings to zero or less than zero. Carried to an extreme we may expect that when revenue derived from new low rates is so increased by added consumption that the earnings of a company are restored to the old rate of return, a new popular clamor for reduction will arise. Again rates will be reduced; again consumption automatically will be increased and finally earnings again will be restored. Then again a new demand for reduction. And so ad infinitum.

Fortunately such a condition could not actually occur because the company would be "broke" long before the pro-

(Continued on Page 26)

"There is a vast amount of difference between devising a rate schedule which will merely encourage increased consumption of gas, and the more difficult task of building a rate structure which will offer to the consumer the lowest possible price, lead him to the maximum use of his facilities, and at the same time permit the distributor to receive a fair return in revenue for the additional service."

*Presented before the Pacific Coast Gas Association's 1934 Annual Convention, Del Monte, Calif., October 9-12.

TABLE NO. 1. PISTON SPEED AND REVOLUTION

Stroke in Inches	Piston Speed in Feet per Minute 700 Ft. (R.P.M.)	800 Ft. (R.P.M.)	900 Ft. (R.P.M.)	1000 Ft. (R.P.M.)
3.00	1400	1600	1800	2000
3.25	1292	1476	1661	1846
3.50	1200	1371	1542	1714
3.75	1120	1280	1440	1600
4.00	1050	1200	1350	1500
4.25	988	1129	1270	1411
4.50	933	1066	1200	1333
4.75	884	1010	1136	1263
5.00	840	960	1080	1200
5.25	800	914	1028	1142
5.50	763	872	981	1090
5.75	730	834	939	1043
6.00	700	800	900	1000
6.25	672	768	864	960
6.50	646	738	830	923
6.75	622	711	800	888
7.00	595	685	771	850
7.25	579	662	744	827
7.50	560	640	720	800
7.75	542	614	696	774
8.00	525	600	675	750

Example: An engine having a 5-inch stroke which is to be operated at 800-foot piston speed should operate at 960 revolutions per minute.

How to Select and Install Automotive Engines Service on Natural

IN the last two years hundreds of used automobile engines have been installed for operation on natural gas. The success of these installations, both from the operating and the cost saving standpoint, has been thoroughly demonstrated and in consequence many more will be installed.

C. Remschel

It is the object of this article to present information bearing upon the selection of proper sized automotive-type engines and upon their installation for satisfactory operation in stationary service.

No type of engine is to operate at wide open throttle and give good service. The proportion of its maximum speed at which it can be safely operated depends upon the design of the engine. The more rigid the crankshaft, the greater the bearing surfaces, the lighter the reciprocating parts (such as connecting rods, pistons, etc.), and the more effectively these parts are balanced in rotation, the higher the rotative speed can be.

Experience has taught that used automobile, truck or tractor engines will usually give satisfactory service when the piston speed (stroke in inches, multiplied by two times revolutions per minute, divided by 12) is not over 800 feet per minute. Installations where the load is intermittent and the hours of operation per year comparatively few, may operate satisfactorily with a piston speed as high as 1,000 feet per minute, and on extreme heavy duty such as a continuous load with long hours of operation per year it might be profitable to operate the engine at not over 700-foot piston speed per minute.

For convenience the writer has prepared Table No. 1, giving the number of revolutions per minute at which an engine should operate, when length of piston stroke is known, to obtain a certain piston speed.

The engines that we are considering must not be confused or compared with

TABLE NO. 2. HORSEPOWER—(Based on 60 Pounds Mean Effective Pressure)

Cylinder Bore in Inches	Four Cylinder Engines Piston Speed in Feet per Minute 700 Ft.	800 Ft.	900 Ft.	1000 Ft.	Six Cylinder Engines Piston Speed in Feet per Minute 700 Ft.	800 Ft.	900 Ft.	1000 Ft.
	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.
3.00	9.0	10.3	11.6	12.9	13.9	15.5	17.4	19.4
3.25	10.6	12.1	13.6	15.2	15.9	18.2	20.5	22.8
3.50	12.3	14.0	15.8	17.6	18.4	21.1	23.7	26.4
3.75	14.1	16.1	18.1	20.2	21.2	24.2	27.2	30.3
4.00	16.1	18.4	20.7	23.0	24.1	27.6	31.0	34.5
4.25	18.2	20.8	23.4	26.0	27.3	31.2	35.1	39.0
4.50	20.3	23.2	26.1	29.1	30.5	34.9	39.3	43.7
4.75	22.6	25.9	29.1	32.4	34.0	38.9	43.8	48.7
5.00	25.2	28.8	32.4	36.0	37.8	43.2	48.6	54.0
5.25	27.7	31.6	35.6	39.6	41.6	47.6	53.5	59.5
5.50	30.4	34.8	39.1	43.5	45.7	52.2	58.7	65.3
5.75	33.3	38.0	42.8	47.6	49.9	57.1	64.2	71.4
6.00	36.1	41.2	46.4	51.6	54.1	61.9	69.6	77.4
6.25	39.3	44.9	50.5	56.2	59.0	67.4	75.8	84.3
6.50	42.5	48.6	54.7	60.8	63.8	72.9	82.0	91.2
6.75	45.9	52.4	59.0	65.6	68.8	78.7	88.5	98.4
7.00	49.3	56.4	63.4	70.5	74.0	84.6	95.2	105.8
7.25	52.9	60.4	68.0	75.6	79.3	90.7	102.0	113.4
7.50	56.7	64.8	72.9	81.0	85.0	97.2	109.3	121.5
7.75	60.4	69.1	77.7	86.4	90.7	103.7	116.7	129.7
8.00	64.4	73.6	82.8	92.1	96.7	110.5	124.3	138.5

Example: A six-cylinder engine having a 3.25-inch bore operating at 800-foot piston speed will develop 18.2 horsepower at 60 pounds mean effective pressure.
If 25 horsepower is required at 60 pounds mean effective pressure at 800-foot piston speed the cylinder bore should be not less than
4.75 inches for a four-cylinder engine, or than
4.00 inches for a six-cylinder engine.

TABLE NO. 3. HORSEPOWER—(Based on 75 Pounds Mean Effective Pressure)

Cylinder Bore in Inches	Four Cylinder Engines Piston Speed in Feet per Minute 700 Ft.	800 Ft.	900 Ft.	1000 Ft.	Six Cylinder Engines Piston Speed in Feet per Minute 700 Ft.	800 Ft.	900 Ft.	1000 Ft.
	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.
3.00	11.2	12.8	14.4	16.1	16.9	19.3	21.7	24.2
3.25	13.3	15.2	17.1	19.1	19.9	22.8	25.6	28.5
3.50	15.4	17.6	19.8	22.0	23.1	26.4	29.7	33.0
3.75	17.6	20.1	22.6	25.2	26.4	30.2	34.0	37.8
4.00	20.0	22.9	25.8	28.7	30.1	34.4	38.7	43.1
4.25	22.7	26.0	29.2	32.5	34.0	38.9	43.8	48.7
4.50	25.4	29.0	32.6	36.3	38.2	43.6	49.1	54.6
4.75	28.3	32.4	36.4	40.5	42.5	48.6	54.7	60.8
5.00	31.5	36.0	40.5	45.0	47.2	54.0	60.7	67.5
5.25	34.6	39.6	44.5	49.5	52.0	59.4	66.8	74.3
5.50	38.0	43.4	48.8	54.3	57.1	65.2	73.4	81.6
5.75	41.6	47.6	53.5	59.5	52.4	71.3	80.2	89.2
6.00	45.1	51.6	58.0	64.5	67.6	77.3	87.0	96.7
6.25	49.1	56.1	63.1	70.2	73.7	84.2	94.7	105.3
6.50	53.2	60.8	68.4	76.0	79.8	91.2	102.6	114.0
6.75	57.4	65.6	73.8	82.0	86.1	98.4	110.7	123.0
7.00	61.6	70.4	79.2	88.1	92.5	105.7	118.9	132.2
7.25	66.1	75.6	85.0	94.5	99.1	113.3	127.5	141.7
7.50	70.8	80.9	91.0	101.2	106.2	121.4	136.6	151.8
7.75	75.6	86.4	97.2	108.0	113.4	129.6	145.8	162.1
8.00	80.5	92.0	103.5	115.1	121.1	138.4	155.7	173.1

The above table shows the maximum horsepower that may be expected under the conditions given. However, the table should be used only where the engine is to operate on intermittent service and for determining whether the engine will carry the maximum load that may be required of it for short periods.

By C. REMSCHEL
Power Engineer
Southern Counties Gas Company

for Stationary Gas Fuel

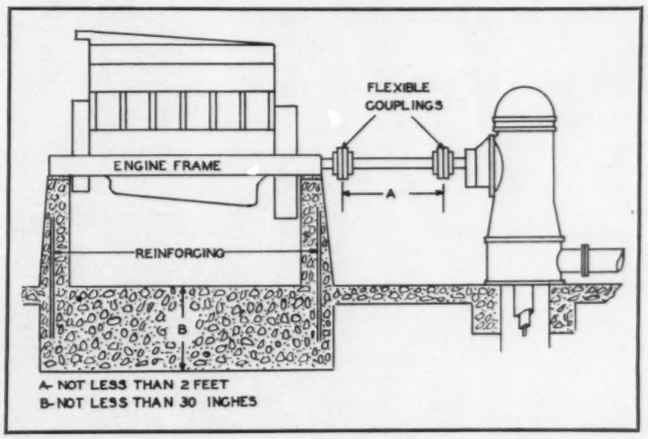


FIG. 1 (Above):
Automotive type engine direct connected to deep well turbine pump through right angle drive geared pump head.

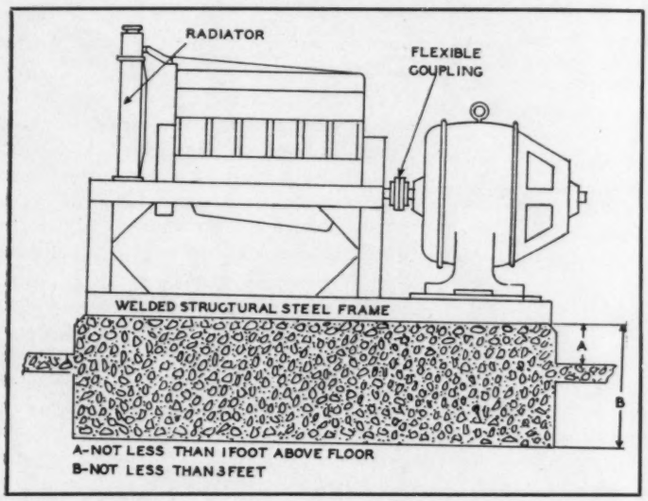


FIG. 2 (Left):
Automotive type engine direct connected to electric generator mounted on steel base.

engines that are especially designed for stationary service, which are able to operate continuously without danger at even higher piston speeds than those shown in Table No. 1.

The horsepower of a gas engine varies nearly in direct proportion to its speed. That is to say, an engine that will deliver 10 horsepower at 1,000 revolutions per minute will deliver 12 horsepower at 1200 revolutions per minute, 11 horsepower at 1100 revolutions per minute, etc.

A gas engine obtains its power from the expansion of the products of combustion produced by the burning of the fuel in the combustion chamber or cylinder of the engine; the more fuel that is being burned, the more power developed.

For every 100 per cent of heat supplied to a gas engine as fuel, 25 to 30 per cent does useful work, the balance of 70 to 75 per cent is about evenly divided between, and dissipated or lost in the exhaust and cooling water.

There is a limit to the amount of heat that an engine can handle, and the horsepower output is dependent upon this factor. All of the heat going out of the exhaust must pass through the exhaust valves, and the more heat that passes through the valves the hotter they become; if the allowable limit is exceeded, the valves burn and then require attention and perhaps replacement.

The heat that can be handled by the cooling system is limited by the area of the combustion chamber in the cylinder and its ability to transmit heat. The more heat that the inner wall of the cooling water has to transmit the hotter it becomes and the greater the expansion of the metal in this wall; the cooling water passing through the cooling water jacket tends to keep the outside wall comparatively cool, and if this temperature difference between the walls becomes too great it causes stresses which may exceed the yield point of the metal and necessitate a new cylinder or cylinder head. This can be avoided by not overloading the engine and by adequate circulation of cooling water.

The safe load on an engine is usually expressed in terms of pounds of mean effective pressure per square inch. Mean effective pressure is the average pressure on the piston during its working stroke. The horsepower output of an engine, the mean effective pressure, and the heat that must be dissipated all vary in direct proportion. It has been the writer's experience that the type of engine under discussion will give quite satisfactory service when the load on the engine is such that the mean effective pressure does not exceed 60 pounds per square inch. Tables No. 2 and No. 3 give recommendations for the maximum horsepower at which engines should operate, based on 60 and 75 pounds mean effective pressure, from 700- to 1,000-foot piston speed, and on both four- and six-cylinder engines.

As stated above, the horsepower of a gas engine varies in direct proportion to its mean effective pressure; i. e., assuming constant speed, an engine that will develop 20 horsepower at 60 pounds mean effective pressure will develop the following horsepower at the given mean effective pressures.

80 pounds M.E.P.....26.6 Horsepower
70 pounds M.E.P.....23.3 Horsepower
60 pounds M.E.P.....20.0 Horsepower
50 pounds M.E.P.....16.6 Horsepower
40 pounds M.E.P.....13.3 Horsepower

In selecting the size engine for the job, or when considering the engine that might be available, the class of service for which the engine is intended is very important. For example, pumping water for irrigation, where the load is constant and the hours of operation per season are many, demands an engine of liberal rating, not over 800 foot piston speed and a mean effective pressure of not over 60 pounds per square inch.

For use in a machine shop, planing mill, rock plant, etc., where the maximum demand is intermittent and the average considerably less than the maximum, and where the hours of operation per year are few, an engine can frequently be more highly rated and still give good service. Mean effective pressure in such service may frequently be as high as 75 pounds at 1,000 foot piston speed, to take care of the intermittent maximum demands, provided of course that the average load will not exceed

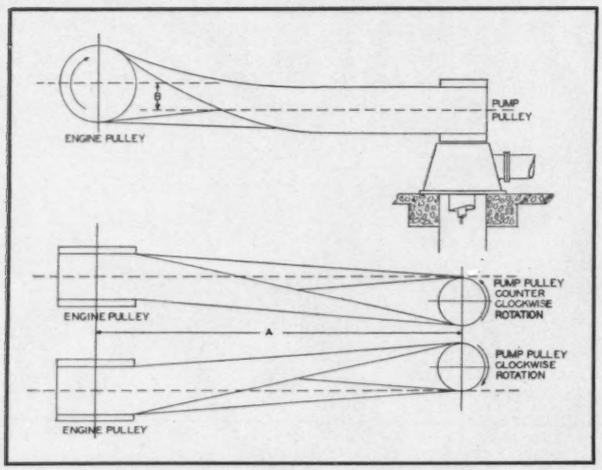


FIG. 3. INSTALLATION OF FLAT BELT FOR QUARTER TURN DRIVE.

A. Distance between pulley centers. This should be from 12 to 20 feet, depending on pulley ratios and width of belt.
B. Center line of engine pulley should be above center line of pump pulley equivalent to 5/8-inch for each foot between pulley centers. Example: 20-foot pulley centers would bring the center of the engine pulley 12½ inches above the center line of the pump pulley.

Belts should be made endless if possible, if not then a smooth and flexible splice should be made. The tight side of the pulley should be on the bottom.

60 pounds M.E.P. and the duration of the peaks does not exceed two or three minutes.

To summarize briefly: In order to obtain satisfactory service a used automotive type engine should not be operated at too high a speed, should not be overloaded, and should be kept constantly cool by an adequate supply of cooling water.

Installation

Since the installation of an engine is as important as its proper selection, the following discussion covers what is required in making a good installation.

Foundation: Machinery that is in motion should have a solid foundation, especially if its motion is reciprocating, as is that of a gas engine. A poor foundation accentuates vibration and loosens parts.

The best foundation and the cheapest in the long run is one built of concrete consisting of one part of cement, three parts of clean sand, and five parts of clean rock and gravel.

The engine should sit on two piers, one at each end, leaving sufficient room so that the crank case pan can be removed readily should this become necessary. These piers should be part of a concrete slab which should extend at least 2½ feet below the ground. This single piece of concrete gives the necessary weight and area for stability and the prevention of settling. When narrow and high piers are necessary reinforcing should be placed in the piers; this can consist of old pieces of scrap iron or pipe. For a general arrangement of a foundation see Fig. 1.

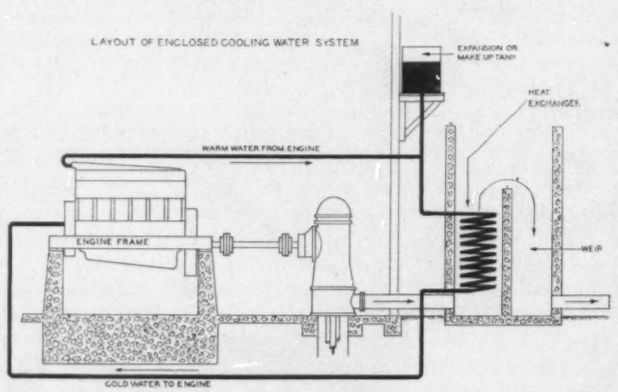
Where engines have to be moved to take up belt stretch, slide rails to which the engine can be bolted should be grouted in on top of the piers allowing easy adjustment when it becomes necessary to take up the belt stretch.

An engine that does not have to be moved once it is installed should first be carefully lined up, then grouted. Grouting should consist of a mixture of one-half cement and one-half clean sand about 1 inch in thickness. When the grouting has set, the engine should be bolted down securely.

Drives: The power developed by the engine may be applied by belting or by direct connection. Belt drive is usually used where the cost of installation is an important factor, as it permits using equipment on hand and usually can be accomplished by merely replacing the electric motor with a gas engine.

When a flat belt is used it is advisable

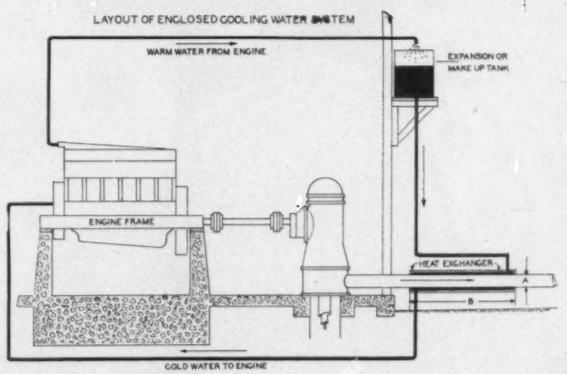
(Continued on Page 23)



HEAT EXCHANGER DATA
Based on Using Copper Coils Submerged

Hp. Load	Size of Copper Pipe I. D.	Length of Pipe in Coil	Size of Connecting Pipes to Engine
10	1 inch	25 feet	1¼ inch
15	1	35	1¼
20	1	50	1¼
25	1¼	60	1½
35	1½	70	1½
50	1½	90	2

FIG. 4.



LENGTH OF PIPE B IN FEET FOR A GIVEN HORSEPOWER

Diameter of A	Horsepower 10	15	20	25	35	50
Inches	Feet	Feet	Feet	Feet	Feet	Feet
4	10	15	20	25	35	50
6	8	10	14	18	....	....
8	5	8	10	12	16	....
10	4	6	8	10	14	20
12	4	5	7	9	13	18
14	3	4	6	8	12	17

Example: For 20 Hp. load with 8-inch discharge pipe from pump, length of pipe B should be not less than 10 feet.
Distance between pipes C should not be over 1 inch. Based on pipe running full of water.

FIG. 5.

Get on the F.H.A. Band Wagon!

● Better housing is a live issue in San Diego Consolidated Gas and Electric Co. territory. Above is an outdoor poster sponsored by the Gas Appliance Association of San Diego County—typical of many similar gas industry gestures in support of Better Housing.

AT LEAST one product which has come out of Washington since the new-dealers took over is being greeted with general approval by the country's business interests, utility companies included. That product is the Federal Housing Administration program, which has received considerable attention in these columns during the past four months.

Centering for the moment upon building improvement and modernization as the quickest avenue to reemployment of building trades, the F.H.A. plan aspires to profoundly change the whole building and property scheme, considered from a long-term view. While rebuilding and improvement are tremendously helpful, the more significant function of the F.H.A. is to remake the structure of building credit and pave the way for new building to resume its normal pace.

The antiquated building finance system which has been long in use in this country, with its three-year loans in first and second mortgages, is heavily blamed for the general collapse of business credit and its failure to revive more rapidly. Foreclosures on short-term building loans left banks and other lending institutions with quantities of unproductive property on their hands and dammed up the normal flow of credit. A dead weight of some 21 billion dollars in frozen building credit has held new building at a standstill.

Through refinancing activities the F.H.A. is attempting to thaw out this frozen credit, and to offer a pattern for future long-term financing in the new building field. This, it is hoped, will establish building credits on a firmer basis for both borrower and lender, since the borrower will not face the need for frequent renewing of loans, and the lender can liquidate his building loans when needed, through sale of mortgages. The program calls for establishment of national mortgage associations to purchase the long-term mortgages insured by F.H.A., paying for them with debenture bonds based upon insured first mortgages; such bonds, it is the aim, will take their place among the soundest of the country's investments.

If the F.H.A. program develops soundly along these broad lines, it can mean a building revival of huge proportions, and one in no way related to the ephemeral building booms of the past.

New building has admittedly lagged years behind its average levels—reasonable estimates hold that more than a million homes would have been built, had there been no depression.

Modernization work since the inception of the F.H.A. program has already started the building curve on the upward turn. According to Bureau of Labor Statistics of the Department of Labor, urban home repair and new construction fell to an all-time low in 1933—a four week average of 18 million dollars. For the four weeks ending September 15 of this year, this figure had risen to 19 millions; for the four weeks ending October 13, 29 millions; and for the four weeks ending November 10, the total was 36 millions. This compares with a 1931 four-week building average of 59 million dollars, and shows that real gains are being recorded.

If building credits are loosened up appreciably during the winter months ahead, as it appears they will be, the spring and summer of 1935 may see a wave of new construction that will keep the building industries and those closely related to them operating in top gear.

The outlook is definitely cheering, and the gas industry with its improved appliances, more general use of dealer outlets, and undiminished direct sales work, is in an excellent position to grasp the opportunity. Many companies, as reported in past issues, are in the forefront of Better Housing cooperation, and the industry is heartily behind the F.H.A. activity as thus far developed.

Of current interest is the plan for cooperation of gas appliance manufacturers, submitted early last month by George W. Bean. Mr. Bean, Washington representative for the American Gas Association, has been appointed to the industries board of the Federal Housing Administration to represent the manufacturers of gas appliances, and the plan which is being circulated to all interested manufacturers has the approval of the F.H.A. Numerous manufacturers are already operating in substantial conformity with the program outlined, but all should be interested in reading the plan as an integrated picture of what can be done by individual firms to aid in the F.H.A. enterprise and translate it into personal profits.

In this plan each manufacturer is urged to cooperate to the full with local Better Housing committees, delegating some qualified company representative to assemble Better Housing information and supervise the company cooperative efforts.

In addition to extending assistance to the establishment of Better Housing activities in all territories where the manufacturer is represented, every firm is urged to see that all contact employees are informed on modernizing loan procedure and are talking it constantly to customers. One practical suggestion is that "lost business" reports be thoroughly reviewed and recanvassed in the light of the favorable financing now available for gas equipment. Specific assistance should be given prospects in negotiating loans. All advertising and publicity of course should feature Better Housing facilities, and cooperative advertising of local interests which stand to benefit from Better Housing financing holds possibilities also.

(Continued on Page 48)

Safe Methods for Use of Oxy-Acetylene Cutting and Welding Equipment

• **E. F. BLANK, Director of Safety and Welfare, Jones & Laughlin Steel Co.; addressing Annual Convention, International Acetylene Association, Pittsburgh, November 14 to 16, 1934.—(Abstract by WESTERN GAS).**

THE past decade has seen great advancement in the use of gas in burning and welding in industry, and while the operations should not be labeled "dangerous," there are certain hazards connected with the use of this equipment which should be publicized and definite ways of eliminating the dangers which should be explained.

Oxygen Cylinders: If outlet valves are stuck they should never be forced or heated, and the tank should be exchanged for a new one if it cannot be operated by hand. Cylinders should never be stored or used where they are liable to come into contact with oil or grease, nor should valves or connections be handled with greasy hands or gloves. If a lubricant is necessary glycerine may be used safely. Tanks should be handled by cranes only in approved containers or slings or cradles, and never by magnet.

Acetylene Cylinders: Every precaution should be taken to prevent leaks at connection to acetylene cylinder valves. Only the wrench provided should be used. If a leak is discovered the cylinder valve should always be shut off before tightening the connection. If a leak cannot be stopped the cylinder should be placed in the open air and should be exchanged rather than a repair attempted. Soapy water should be used as a test for acetylene leaks; never use a match. Copper fittings should never be used on tanks, as acetylene gas acts on copper under some conditions to produce an explosive compound. Brass or bronze fittings can be used safely.

Regulators: Regulators or reducing valves must be used on both oxygen or combustible gas cylinders. They should be kept in good repair at all times, this work being done by experienced and skilled workmen. All oxygen gauges should be marked "Oxygen—Use No Oil." Oxygen regulators should not be attached to cylinders containing the combustible gas, or vice versa.

Hose: Oxygen and acetylene hose should be of different color and not interchanged. It should be carefully examined, at least once a week, for leaks, worn places, loose connections, etc. Defective or worn hose should never be used. If a backfire occurs and reaches the hose, that length of hose should be discarded because of burned inner wall. When a new connection is made all air should be expelled from the hose before lighting the torch.

Operating Cutting and Welding Equipment: Cylinders during use should be kept in as nearly an upright position as possible. When used in a special carrier or truck there should be an asbestos partition between the oxygen and gas tank. It is recommended that this partition be of asbestos ¼-inch thick with 1/16-inch metal on each side. The partition should extend at least from a point below the top of the shorter cylinder to a point above the top of the higher cylinder. Oxygen and gas tanks when not used in carriers should be kept at least 6 feet apart unless separated by a standard asbestos partition.

Especially designed goggles should be worn, as the flame is very injurious to the eyes. When welding brass, bronze, or galvanized material, protection against fumes should be provided. Operators' outer clothing should be of wool or other fire-resisting material and should not be permitted to become oil soaked. A friction lighter should be used to light the torch, as the operator's hands may be burned if utilizing matches. Gases should never be mixed in a cylinder for any reason, as a combination of certain gases may result in a highly explosive mixture. Work must not be done where there is danger of explosion of dust or gas. Before welding or cutting a container that has been used for inflammable material it should be purged and, if large, tested with a flammable gas indicator. Compressed oxygen must never be used as a substitute for compressed air for operating pneumatic tools, spraying oil, paint, or other liquids, or for head pressure in a tank of any kind.

Flat Fee for Refrigerator Insurance Inaugurated by New York Companies

• **J. LOBENSTEIN, Chairman "Parts Replacement or Maintenance Policies for Gas Refrigerators" Sub-Committee; A.G.A. Commercial Section Interim Bulletin No. 14, October, 1934.—(Abstract by WESTERN GAS).**

THE New York City gas companies have placed in operation a scheme whereby free maintenance of Electrolux installations is guaranteed in return for a small annual payment by owners. Operation details of the Consolidated Gas Co. of New York plan are presented as typical.

When this company started the sale of Electrolux refrigerators each unit carried a one-year guarantee on defective parts. Beginning August 1, 1930, and continuing to February 1, 1934, a two-year guarantee was given but free replacements made after guarantee expiration. Since this latter date parts have been charged for but labor is still free. The company will, however, for an annual payment of $2 in the case of multi-family homes equipped with a number of refrigerators, or $3 in the case of installations in single dwellings, replace all defective parts. It is estimated from operating costs to date that this charge will be adequate to protect the company and it is felt that this will be a convenience to customers, especially tenants in multi-family buildings who would otherwise have to obtain consent of owner before replacement could be made.

Any company could establish similar rates based on past service expense. The agreement is in the nature of a signed contract between customer and company. A small commission may be paid for original signed contracts, which might be obtained by service men. Customers are given to understand that the payment of $2 or $3 is for the year ending February 1, 1935, only, and that subsequent prices may need adjustment for reasons out of company control; it is hoped, however, that no change will be necessary.

Contracts are cancellable on 30 days' notice by customer and refunds made on basis of unexpired time. Wholesale (multi-family) contract payments may be made semi-annually in advance. Retail contracts are payable only in one payment in advance. Service covers only unit and control and not box or finish, hardware, gaskets, shelves, etc. If con-

tracts as offered are not accepted, unit charges will be as follows:

Units	$45.80
Thermostat	7.00
Burner	4.70
Water Control	4.20
Combination Strainer and Pressure Regulator	4.70

Gas Heat Covers Chicago

GRAPHICALLY illustrating the contentions of The Peoples Gas Light and Coke Co. that "gas heat covers Chicago" a gigantic map, pictured below, has been placed in the main floor corridor of the Gas Building in Chicago.

Despite the huge size of the map, there was not room in it to show every installation of the 17,000 in use inside the city. The way in which the pins are spread out over the entire city, except in the manufacturing districts, shows that gas heat is being accepted by those of moderate income as well as by residents of the "Gold Coast."

Viewed by between 15,000 and 20,000 people who pass through the Gas Building's corridors every day, the map has attracted an unusual amount of attention, part of it probably due to the inherent fascination which maps have for almost everyone. People also seem to enjoy finding out whether their neighbors or friends have installed gas heat, by tracing the pins shown on the map.

A glance at the photograph will show that the only blank areas inside the city are the public parks and the railroad terminals. The map has caused considerable comment from people who thought that gas heat was being sold only to the wealthier Chicago families, and who are surprised to find that "gas heat covers Chicago."

This huge map is a center of interest in People's Gas Building.

Eliminating the Internal Corrosion of Natural Gas Transmission Lines

● E. F. SCHMIDT and T. S. BACON, Lone Star Gas Co., Dallas, Texas, in A. G. A. 1934 Report to Natural Gas Department—(Abstract by WESTERN GAS).

BOTH practice and theory agree that liquid water must be present in the pipe line for corrosion to occur, unless the pipe line is operating at temperatures that are very much in excess of normal. However, it is possible that former corrosion may have caused the formation of capillaries in the pipe metal so that even if the gas entering the line were dehydrated sufficiently to prevent condensation of water in a non-capillary iron pipe, condensation in the capillaries and consequently corrosion of the particular line might occur even after dehydration.

In all reported cases of serious internal corrosion of pipe lines, oxygen has been present in the gas. Practice has clearly indicated that oxygen must be present for serious corrosion to occur, even if all other factors favorable to corrosion are at hand, such as high line pressure, high hydrogen sulphide concentration, and liquid water on the pipe surface. Hydrogen sulphide and carbon dioxide are the acid constituents most commonly found in natural gas. Carbonic acid is an extremely weak acid, and probably has but little effect on pipe line corrosion. Hydrogen sulphide is also a very weak acid. However, in the presence of liquid water and oxygen it will react readily with iron or iron oxides. The corrosion rate in steel pipe may be assumed to be roughly proportional to the partial pressure of hydrogen sulphide in the gas, so long as liquid water is present and the concentration of oxygen is more than 100 times the concentration of hydrogen sulphide.

This corrosion by hydrogen sulphide may be eliminated or alleviated in the following ways:

1. Protection of the pipe metal by applied coatings.
2. Use of pipe metal alloys that will withstand corrosion.
3. Dehydration of the gas entering the distribution system.
4. Removal of oxygen from the gas.
5. Removal of hydrogen sulphide from the gas.
6. Addition of inhibitors to the gas.

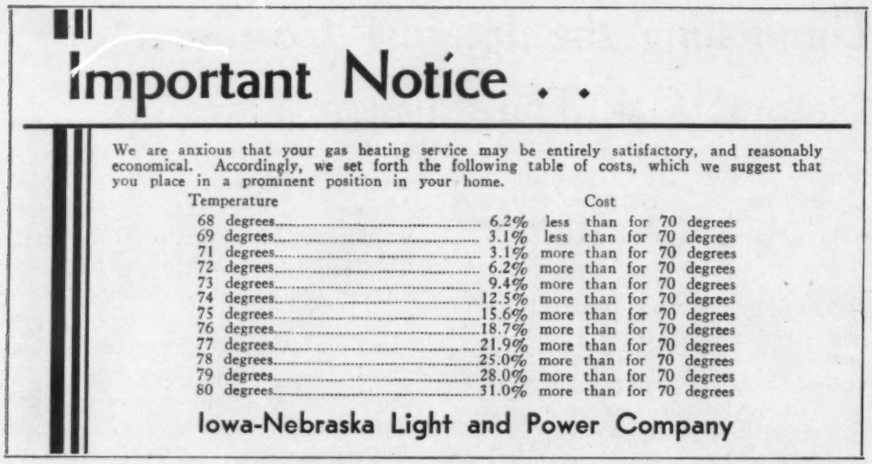
The use of protective coatings inside the pipe is receiving an increasing amount of attention. Cement-lined pipe has been used with some success in handling corrosive gases and liquids. Corrosion resisting alloys for pipe fabrication seem to be limited to the development of a reasonably priced pipe lined with a thin layer of a high-chrome stainless alloy. Dehydration of gas entering the transmission system has received considerable attention, several commercial installations having been made with apparently good success. An economical method for the substantially complete removal of oxygen from natural gas would be welcomed by the industry. Many processes have been investigated for the removal of hydrogen sulphide. Nearly all of the "liquid" processes will leave appreciable amounts in the scrubbed gas; one, however, developed by the Lone Star Gas Co. gives very complete removal, and consists of passing the gas (which must contain some oxygen) through a suspension of iron and zinc salts in a dilute soda ash solution; the oxygen in the gas is partly absorbed by the alkaline solution and serves to oxidize the metallic sulphides formed in the solution nearly as rapidly as they are formed; due to this rapid oxidation the partial pressure of hydrogen sulphide over the scrubbing solution is maintained at a very low value. The iron oxide box effects removal almost quantitatively but the cost of construction and operation of such boxes under high pressures is high and prevents their use on most natural gas lines. The addition of some chemical to the gas to inhibit the action of corrosive agents has received no attention by the gas industry to date. The concensus of opinion at present appears to be that the most economical way of preventing internal corrosion is by dehydrating the gas entering the lines.

Laboratory Inspections Under Way in Appliance Factories

Annual inspections conducted in the fall of each year by the A.G.A. Testing Laboratory in the factories of all manufacturers of approved gas appliances, began on September 15 and were under way during all of November. During the inspections various models on which it is desired to have approval renewed or extended for the succeeding year are examined by Laboratory inspectors.

New Use for Natural Gas

Compressed natural gas has replaced oxygen in soldering tanks of all sizes at the Columbian Steel Tank Co.'s Kansas City plant.



Important Notice . .

We are anxious that your gas heating service may be entirely satisfactory, and reasonably economical. Accordingly, we set forth the following table of costs, which we suggest that you place in a prominent position in your home.

Temperature	Cost				
68 degrees	6.2%	less	than	for	70 degrees
69 degrees	3.1%	less	than	for	70 degrees
71 degrees	3.1%	more	than	for	70 degrees
72 degrees	6.2%	more	than	for	70 degrees
73 degrees	9.4%	more	than	for	70 degrees
74 degrees	12.5%	more	than	for	70 degrees
75 degrees	15.6%	more	than	for	70 degrees
76 degrees	18.7%	more	than	for	70 degrees
77 degrees	21.9%	more	than	for	70 degrees
78 degrees	25.0%	more	than	for	70 degrees
79 degrees	28.0%	more	than	for	70 degrees
80 degrees	31.0%	more	than	for	70 degrees

Iowa-Nebraska Light and Power Company

FIG. 1.

Educate the House Heating Customer to Retain His Business

• **STANLEY TABER, Chairman "Retaining the Present House Heating Customer" Sub-Committee; A.G.A. Commercial Section Interim Bulletin No. 10, October, 1934.—(Abstract by WESTERN GAS).**

THERE are three aspects which must be considered relative to retaining the present house heating customer; gas rates must be competitive or customer must be willing to pay premium for the ideal fuel; the gas must be burned efficiently; customer must be educated to the efficiency, economy and innumerable other advantages of gas heat. This discussion deals with the third or educational aspect, narrowed down to two types of customers; those who are satisfied and must be kept so; those who are definitely dissatisfied.

Regarding the first type of customer, it is assumed that he has been properly approached and truthfully sold, and the installation has been efficiently made. The salesman should call back a few days after the installation to inspect it, demonstrate operation and show and express the company's interest; he should call back again after the first gas bill has been rendered. As a further aid in showing the company's interest a cordial letter might be sent to the customer thanking him for the business and assuring him of service and cooperation; this letter should enclose helpful information such as that on the card shown as Fig. 1, giving cost results of maintaining various temperatures. If the equipment does not function properly, a competent service man should be instantly dispatched who will stay on the job until the trouble is permanently remedied.

Coming to the dissatisfied customer, four major types of complaints are encountered: insufficient heat, distribution of heat, humidity and high bills.

Discussing insufficient heat and assuming adequate capacity of original installation, it is often found that the thermostat is set back too far at night so that normal pick-up of the furnace is not adequate to rapidly heat on a cold morning. The customer should be advised not to set back the thermostat more than 5 degrees in cold weather and, if absolutely necessary, the heat input should be raised at the burner. Perhaps too much heat is lost in the basement, indicating the need of furnace insulation. If the basement is too cold some auxiliary form of heating should be suggested.

Correct distribution of heat is often merely a matter of proper damper setting in the various ducts. Drafts are another common complaint, caused by cooling of warm air on large cool surfaces, which air travels past the occupants before entering the cold air returns; they may be remedied by increasing the area of registers or ducts or installing additional cold air returns. Customers desiring absolutely uniform heat throughout the house and each room should be told the limitations of thermostat location and the unavoidable temperature difference between floor and ceiling.

As most warm air furnaces are equipped with water evaporating pans control of humidity is relatively simple except when irregular firing is done and condensation may result from rapidly cooling rooms. This is a matter of customer education. With radiator systems, seldom equipped with means of furnishing moisture, it is usually necessary to persuade the customer to purchase humidifiers of portable type or have pans made, to fit radiators, suitable for evaporating moisture. Sometimes humidity is caused by plugged vent pipes, throwing combustion products into the room.

High bills are largely remedied by customer education through presentation of logical and truthful facts. New customers are usually startled by the first bill and wonder what will happen when the weather "really gets cold." They should be given degree-day information, their probable heating bill estimated, and an explanation of decreasing gas rate with increased consumption. Second year or "old" users of gas usually compare their bills to those of the previous year, to their neighbors', or to the price of oil or coal. Degree day difference or length of billing period usually explains the last year's differential. Living habits and size of type of house can be shown to justify the neighbors' bill. Comparison with coal or oil bills should be made only over a seasonal period. The following efficiency table is useful:

Type of Heating Plant	Average Overall Efficiency—Per Cent
Warm Air Gas Conversions	65.9
Gas Designed Furnaces	74.4
Hot Water Gas Conversions	69.0
Steam Gas Conversions	62.0
Coal Efficiency (mostly warm air)	59.5
Oil Efficiency (mostly warm air)	42.2

Complaints rarely come from insulated houses, the saving in fuel costs due to insulation having been found to vary between 10 and 30 per cent.

Guymon, Okla., Gas System Sold; New Company Chartered

The natural gas distribution system of the Cimarron Utilities Co., at Guymon, Okla., has been sold to A. J. Hardendorf of Kansas City, who is organizing the Guymon Gas Co. to operate the distribution system and Bacon well, also purchased by Mr. Hardendorf. The Oklahoma Corporation Commission will be asked to approve a revised rate schedule, in which the top rate will be reduced to 30 cents per M c.f. with 10 per cent discount for prompt payment.

Mr. Hardendorf has announced that Floyd Hunt, formerly with the Cimarron Utilities Co., will manage the new company, which has been capitalized at $12,500.

El Paso Refused PWA Aid

After approximately two years of negotiation El Paso, Texas, was recently refused a loan from the Public Works Administration for the purpose of purchasing a municipal gas distribution system.

Special Heat Requirements Met By Immersion Firing

An interesting heating problem at the recently opened Continental Health Club at 560 Sutter St., San Francisco, has been efficiently solved by the application of immersion gas firing.

It was desired to provide a means of securing a dry heat of approximately 140 degrees in a scientifically constructed dry heat room, 8 x 12 feet, with a 10½-foot ceiling. According to the management of the Continental Health Club, the trend in physical culture institutions generally is away from hot steam because of its bad nasal and sinus effects. A dry heat, simulating a natural desert atmosphere, is now the desired method of treatment.

In devising a way to secure this atmosphere, it was evident from the first that it would be impossible to use an appliance with an open flame in the hot room itself, as such a flame would quickly dissipate the oxygen in the atmosphere, resulting in unhealthy conditions. It was therefore decided to install a Hones immersion gas burner, firing from the outside, through the wall into the hot room. The hot air travels through 12 feet of 3-inch pipe, and back to the wall through which it is vented up through the roof. The burner pipe is insulated where it passes through the wall; the room and windows are also insulated to prevent losses by radiation.

With this method of firing a temperature of 140 degrees can be reached in the hot room in a period of 40 minutes, with a possible maximum of 170 degrees if desired. The gas consumption is approximately 40 cu. ft. per hour. Thermostatic control makes operation of the system automatic.

New Natural Gas Field For California in Sight

Possibility of a new natural gas supply in California 75 miles north of any present field of production appeared on November 15, with the coming in of a wildcat well 12 miles west of Chowchilla in Madera County, and approximately 75 miles north of Kettleman Hills. At the time the well came in, the 9-inch casing was set at 7,765 feet, while the bottom of the hole was 8,030 feet.

Preliminary estimates indicate that the new well will supply from 8,000,000 to 10,000,000 cu. ft. of dry gas per day. It is owned by the Pure Oil Co. of Chicago, Ill.

Municipal System Increases Rates

The Natural Gas Department, City of Long Beach, Calif., is increasing domestic rates 20 per cent and commercial rates 10 per cent in order to balance the city budget. The new rate became effective December 1 and is expected to provide $180,000 additional revenue during the remainder of the city's fiscal year.

Assistant Vice-President at Portland

Charles M. Sanford, formerly assistant general manager of Pacific Power & Light Co., has been appointed assistant vice-president of the Portland Gas and Coke Co., Pacific Power & Light Co., and Northwestern Electric Co. Mr. Sanford will have charge of a newly created property department.

Explosion Hazards from Manhole Atmospheres Covered in Boston Study

• U. S. Bureau of Mines Report of Investigations 3260, October, 1934.—(Abstract by WESTERN GAS).

A SURVEY of explosion hazards was made in 1933 in manholes owned by the Edison Electric Illuminating Co. in Boston and adjoining towns and in manholes of the New England Telephone and Telegraph Co. in the same territory. The survey was conducted by the Edison Electric Illuminating Co. and the Boston Consolidated Gas Co. in cooperation with the U. S. Bureau of Mines. A total of 12,291 tests were made in Edison manholes and 3,014 in manholes of the New England Co. Comparison of results obtained in the 1933 survey in Edison manholes with those obtained during 1929-30, 1931 and 1932 shows a steady improvement since the beginning of the survey, indicating what may be accomplished in other cities by similar methods.

The effect of time of year on the accumulation of combustibles is shown in Fig. 1, the months of extreme hot or cold weather appearing to favor this accumulation. The range of composition for 1933 is shown in Table No. 1. Many of the samples contained carbon monoxide in proportions that would be fatal to workmen entering the manholes without proper protection. Many atmospheres were deficient in oxygen; some were so low that workmen breathing them would be overcome quickly. Some of the samples contained sufficient carbon dioxide to make respiratory protection essential for workmen.

A study of the constituents found in the manholes during the 5-year survey shows that contaminations may be divided into three classes as follows:

1. Gases containing hydrogen, carbon monoxide, illuminants, methane, and ethane. These contaminations have been found to be due usually to leakage of manufactured gas from gas mains, services, and other sources. At times gases of a similar nature may have been produced by thermal decomposition of hydrocarbon material in the manhole of duct lines.

2. Gases containing high percentages of carbon dioxide, varying quantities of methane, little or no carbon monoxide, hydrogen, illuminants, and less than 17 per cent oxygen. Most of these mixtures are nonexplosive when mixed either with air or combustible propane gas. Atmospheres of this type have been termed "soil" gas because the low oxygen content appears to have been caused by reactions between the oxygen in the air and organic or other materials in the soil.

3. Gases containing gasoline vapor. In the atmospheres sampled the gasoline vapor was insufficient to produce explosions.

Contaminations from more than one source were found in many of the samples analyzed, and, usually there was no sharp dividing line between the classes of contamination.

TABLE NO. 1.

Constituents	Edison Elec. Illum. Co. Manholes, % by Volume	N. E. Tel. & Tel. Co. Manholes, % by Volume
Carbon dioxide	0 to 4.6	0 to 16.7
Illuminants	0 to 1.3	0 to 1.6
Oxygen	10.5 to 20.9	3.3 to 20.9
Hydrogen	0 to 15.8	0 to 15.8
Carbon monoxide	0 to 1.2	0 to 2.1
Methane-ethane	0 to 13.4	0 to 12.8
Nitrogen	57.0 to 81.9	57.9 to 83.0

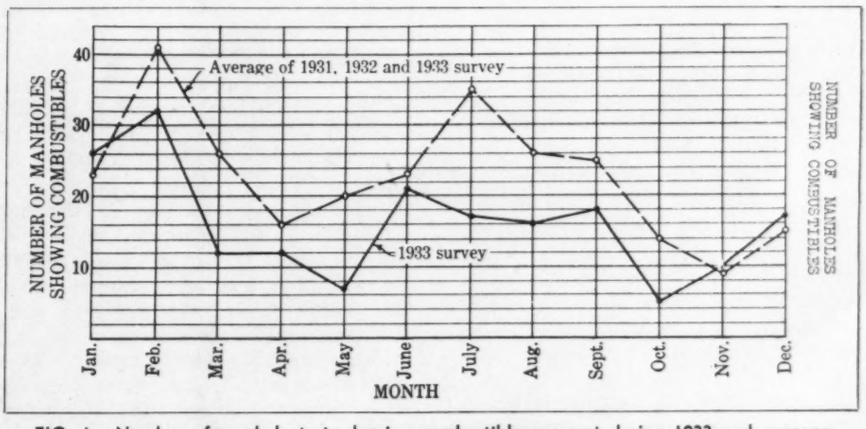


FIG. 1. Number of manhole tests showing combustibles present during 1933 and average for the years 1931, 1932 and 1933 surveys plotted on a monthly basis.

What Is Good Practice in Designing Meter and Regulator Stations?

• R. M. SCOFIELD, Lone Star Gas Co., Dallas, Texas; in Report of Sub-Committee on Practical Meter and Regulator Stations, to 1934 Southwest Gas Measurement Short Course, University of Oklahoma—(Abstract by WESTERN GAS).

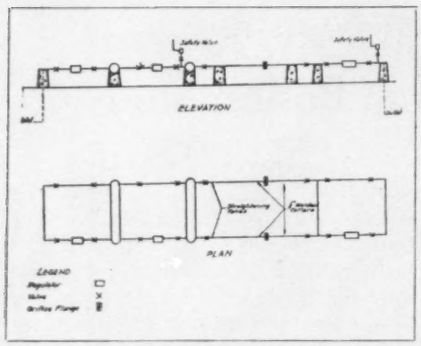


FIG. 1.

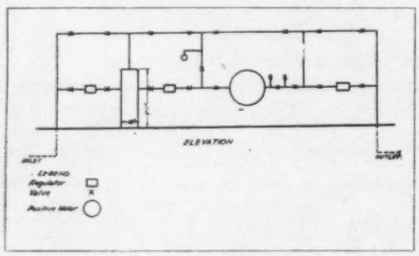


FIG. 2.

IN constructing town border or main line industrial measuring stations where main line pressures range from 175 pounds to 350 pounds, and a reduction is desired to intermediate pressures from 30 to 2 pounds, the use of three regulators is considered the best practice. If only two regulators are used freezing will be experienced in cold weather and heating devices will be necessary. This difficulty is eliminated if three regulators are used, two ahead and one after the measuring device, so adjusted that the pressure on the low side of each regulator is one-half or more (preferably 5 to 10 pounds more) than on the high side.

To provide proper regulation, sufficient reservoir or cushioning space between regulators is absolutely necessary; with adequate cushion space provided, the distance between regulators need not be considered. Fig. 1 shows the relative positions of the set-up components, with a cushion after the first and second regulators. For 4-inch pipe the cushions would be made of 12-inch pipe 6 feet long; for a 6-foot installation 18-inch pipe should be used.

For a positive meter installation with three regulators, only one cushion is necessary, as the meter itself provides cushioning. Fig. 2 illustrates this set-up, which has also been constructed vertically to save ground space. A cushion in this vertical position should have a blow-off at the bottom.

Relief valves should be installed ahead of the meter to protect it—and the distribution system beyond—from excessive pressure due to possible regulator failure; in some instances a second relief valve on the low side of the set-up is also desirable. Such valves should be vented to the outside, and should be installed with a gate or plug valve ahead so they can be worked on without shut-down of station.

Separate by-pass lines are recommended for each regulator and each meter, and since a complete shut-off is required on the by-pass lines, it is recommended that either one plug valve be used or two valves with a flange between them in which a blank plate may be installed.

Most companies building town border and industrial installations place the meter runs in both horizontal and vertical stations at least 21 inches from the ground or floor level to the center of the pipe. This requires very little more pipe and the meters and regulators so installed are much more accessible for repairs or replacements.

Some companies use standard measuring stations with one regulator before and one regulator after the meter and others use two regulators ahead of the measuring device and no regulator after. However, specifications in general are the same. Some companies in order to conserve space build their installation in a U shape and not drawn out full length as shown in Figures 1 and 2.

One of the greatest problems in designing a measuring station is the problem of measuring both the maximum and minimum deliveries accurately. Some companies use automatic differential control valves with two or more meter runs, the first line with an orifice plate of the correct size to give a suitable reading of the differential on minimum requirements and with orifice plates in the other lines of a size to give a suitable reading when the load becomes too great for the first line and the second and third lines are automatically turned in by means of the automatic valve. On smaller deliveries but with a wide variation in load a positive meter and orifice meter have been used together with the positive meter measuring the minimum deliveries and the orifice meter measuring the maximum load, the orifice meter line being turned in by means of an automatic valve when the load approaches the capacity of the positive meter.

Where load variations are seasonal or periodic, two positive meters in manifold have been used satisfactorily, with only one in use for the minimum load and the other turned in by hand when the load approached the capacity of the first meter. Where a greater variation occurs, a positive meter and an orifice meter have been used in manifold, with the positive meter being used during periods when the demand was within its rated capacity and the positive meter being turned off and the orifice meter turned in during periods when the demand increased to the capacity of the positive meter.

Another method of measuring wide variations in load, used by some companies satisfactorily, is by means of the wide range orifice meter; that is, the use of an orifice meter of 0-100-inch range in connection with one of 0-20-inch range installed together on the same set of meter piping. An orifice plate is installed to measure accurately the maximum load on the orifice gauge with the 0-100-inch range. The 0-20-inch meter is used and the chart from this meter is read during those periods when the differential reads less than 20 inches. Such an installation has the advantage of being more economical to install than other wide range equipment but at the same time requires that the orifice plate be changed more often. However, plate changes are only necessary in most instances during seasonal changes.

Mobile Gas Co. Reorganization Plan Gets Approval

The reorganization plan of the Mobile Gas Co., presented to the Alabama Public Service Commission in September, has been approved by the Commission, and also by the district court of the United States for the southern district of Alabama, southern division. The company is now being operated as the Mobile Gas Service Corp., under the management of Consolidated Electric & Gas Co., headquartering at New York City, according to J. W. Gates, division manager.

Developing Mississippi Field

Amory (Miss.) Petroleum Co., has begun developing the Rye natural gas field located about 15 miles northeast of West Point, Miss., to supplement natural gas supply to the towns of Amory, Tupelo, Okolona and Aberdeen, Miss. Source of present supply is in the Amory field.

Kansas Power & Light Operating Neb. Natural Gas Distributing Co.

General offices of the Natural Gas Distributing Co., formerly located in Lincoln, Neb., have been moved to Salina, Kan., and operation of the company has been taken over by the Kansas Power & Light Co.

Nebraska headquarters of Natural Gas Distributing Co. have been transferred to Holdrege, with Luman F. Collins in charge as district manager. All Nebraska activities of the company will be handled through the Holdrege office. The company is discontinuing the merchandising of gas appliances and equipment.

Mr. Collins was formerly district superintendent of Pubic Service Co. and Peoples Gas Co., subsidiaries of Kansas Power & Light, headquarters in Pratt, Kan.

Corpus Christi Plant of Southern Alkali Using 6½ Million Feet Daily

Southern Pipe Line Corp. has completed its gathering system originating in the Southern Minerals Corp.'s gas leases in Saxet field, 5 miles west of Corpus Christi, Texas. Gas is being delivered through the company's new 8-inch transmission line to the Southern Alkali Corp.'s plant which recently began operating in Corpus Christi, according to S. Matson Nixon, special representative in Texas. The plant is using 6½ million feet daily, and will increase its demand soon.

Both Southern Pipe Line Corp. and Southern Minerals Corp. are owned by Southern Alkali.

Lloydminster, Sask., Now on Natural Gas Service

Lloydminster Gas Co., Ltd., has begun service of natural gas to residents of Lloydminister, Saskatchewan, Canada, according to A. I. Payne, engineer in charge. Supply for the system is obtained from the company's 16,700,000 cubic foot well just outside the city. The gas is of 980 B.t.u. Four miles of 4½-inch O. D. and 2-inch I. D. steel pipe make up the distribution system. Approximately 150 consumers are already being served and the company expects to bring this number to 350.

Natural Gas Supply Supplemented To Texas Cities

Texas Gas Utilities Co. is constructing a 32-mile 6-inch natural gas pipe line from the company's field 20 miles from Eagle Pass to a point 10 miles below La Prior, to connect with the 4-inch main line which serves Crystal City, Carrizo Springs, La Pryor and Uvalde, Texas. The new line will supplement the supply of natural gas to the cities. Present supply now comes from Zavala County field, 12 miles south of Uvalde.

Voters Increase Gas Rates

With a vote of 322 for and 60 against, the citizens of Quinton, Okla., put into effect a new franchise to cover an increase in gas rates. The town is served natural gas by the Central States Power & Light Corp.

Intermittent Electrical Drainage for Pipe Protection

● A. B. ALLYNE, Southern Counties Gas Co., Los Angeles, Calif., in report to Pipe Protection Sub-Committee, Pacific Coast Gas Association, at Annual Convention, Del Monte, Calif., October 9-12, 1934; (Abstract by WESTERN GAS).

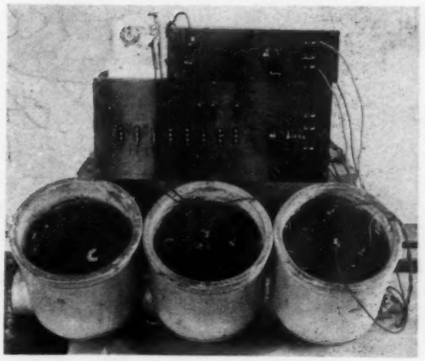


FIG. 1.

IT IS generally known that a steel pipe line may be protected from soil corrosion by continuously maintaining the pipe at a negative potential with respect to the surrounding soil. Recently, it has been observed that when the electrical drainage of certain lines is interrupted, the pipe does not immediately return to ground potential. This phenomenon suggested that perhaps a pipe line can be adequately protected by intermittent drainage, effecting a considerable saving in power costs. This report is an account of the experimental work done to date to show the feasibility of such a procedure.

A. B. Allyne

The fact that a steel sample being electricaliy protected in soil does not depolarize immediately upon discontinuance of the drainage, was demonstrated in the laboratory by the following series of tests.

Bare steel plates 1 inch x 1 inch were buried in wet soil in a gallon crock and connected to a battery by wires leading up through the soil. By means of a carbon electrode placed in the center of the crock and a storage battery, a seven-tenths volt negative potential (with respect to the soil) was applied to the steel samples for various time periods of from one second to 60 minutes. The rate of drop in potential of the steel samples upon breaking the circuit was measured in each case by means of a copper sulphate electrode and potentiometer.

From this series of tests it was concluded that the most practical "off and on" cycle for such a drainage system would be one minute "on" and two minutes "off."

Drainage tests were next conducted on the three sets of steel samples to determine if proper protection from corrosion could be afforded the steel by such a method. Three 1-gallon crocks, each containing two of the weighed 1 inch x 1 inch steel plates in the same wet soil, were treated in the following manner.

Crock 1. No electrical protection whatever (control samples).

Crock 2. Intermittent electrical drainage, using the one minute "on" and two minute "off" cycle, with the samples held at one volt below soil potential when drained.

Crock 3. Continuous electrical drainage, with the samples held at one volt below soil potential.

The apparatus used for these tests is shown in Fig. 1. The samples in the center crock were intermittently drained by means of the electrical time switch shown in the upper left. The large gear, rotated by a Telechron clock, had a 3-minute cycle and made contact between the battery and samples during but one-third of its rotation period.

If the intermittent drainage procedure is to prove practical, the loss of weight of the samples so protected should be

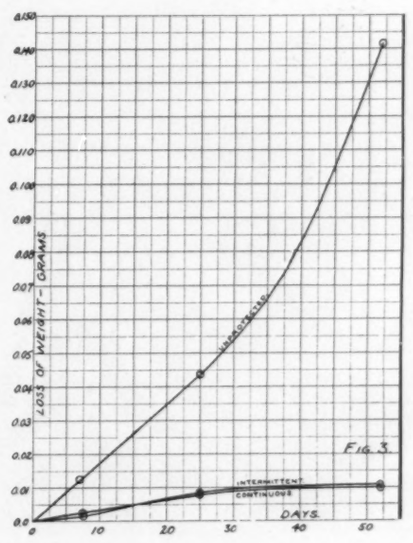


FIG. 2.

approximately the same as that of the continuously drained samples. The three sets of samples were removed, cleaned, and weighed after several time periods. Their losses in weight with time are shown in Fig. 2. It may be seen that the intermittently drained samples were afforded practically the same protection as those that were continuously drained, and at one third the power cost.

People's Co. Offers Kitchen and Basement Planning

A REVIEW of gas company programs, tieing in with the Better Housing activities of the Federal Government, published in November *Western Gas,* made brief mention of a new department added by the People's Gas, Light and Coke Co. of Chicago—the Kitchen and Basement Planning Bureau. Further details on the organization and service field of this new People's Company institution are of interest, and Harry Swenson, director of the Bureau, supplies information from which the following is offered:

The Bureau had already been in existence for several months as the "Kitchen Planning Bureau," but with the development of national housing activities, the possibilities for wider service were quickly capitalized by broadening the service into a Kitchen and Basement Planning Bureau, in charge of Mr. Swenson. Now the Bureau has the twofold purpose of giving an authentic interpretation of the National Housing Act to People's Company customers, with information on how to obtain loans, and of rendering expert advice for modernizing kitchens and basements.

Customers are informed through advertising that the Bureau is ready to serve them with information on every angle of loan procedure under the National Housing Act, and to help in planning expenditures intelligently.

A series of visual exhibits of plans, materials and equipment is being created under Mr. Swenson's direction. Type and source of materials, together with names of qualified firms and contractors, ready to undertake modernizing and repair work, are available at the Bureau. General advice and actual plans may be had there, with approximate estimates of costs for the desired improvements.

One exhibit representing in type others now in course of construction is illustrated below. This exhibit is entitled "The Modern American Gas Kitchen." The colors chosen for it are those of the flag, white for the main units, soft variations of blue for larger areas, and accents of clear red for accessories and details. It is designed to appear more as a realistic kitchen than as a display, and the effect of colors and arrangements is eye-compelling and convincing. The exhibit has already aroused much favorable comment from People's Company patrons.

It is intended that the Bureau exhibits shall embrace all appliances and materials approved for kitchen and basement modernization, including practical information and display of suitable insulating materials.

In the People's Gas, Light & Coke Co. scheme the Kitchen and Basement Planning Bureau operates in sympathy with but entirely separate from the Home Service Department, and forms another effective link between company and customer. Home service has been an outstanding success in the People's Company, being centered around a chosen personality which in the customer's mind forms a symbol of the company. The personalized contact is also stressed in operation of the Kitchen and Basement Planning Bureau.

The staff of the Bureau is versed in fundamentals of kitchen routine, placing and decoration, and is also familiar with materials and building services involved in redesign of home interiors. Every opportunity will be taken to stimulate interest in kitchen and basement improvement. Since the gas company is very actively promoting sale of gas for house heating, the basement planning service has large potentialities.

Mr. Swenson points to the universal interest shown in the modern gas kitchens and basements at the gas industry exhibit prepared for A Century of Progress, as indicating the growing interest in this department of the home. The National Housing Act is speeding the revival of this interest, and such related activities as those of the People's Company Kitchen and Basement Planning Bureau are adding momentum.

"The Modern American Gas Kitchen"—created by Peoples Gas Light and Coke Co. Color scheme is red, white and blue.

Western United Active In Pipe Line Construction

Western United Gas and Electric Co. of Aurora, Ill., supplying gas to approximately 100 towns in the state, has completed the construction of 8 miles of 16-inch pipe, paralleling an existing line north of Joliet and tieing in with a 12-inch line constructed in 1933. Both the 1933 project and the present line were constructed to increase capacity of the system serving gas to the surburban territory just west of Chicago. The line is constructed for 100 lbs. pressure and is acetylene welded. Construction started July 20 and was completed September 29.

During the current year Western United has constructed two miles of 12-inch pipe for delivering natural gas to the production station of the company just north of Joliet and two miles of 8-inch pipe increasing the facilities to Wheaton, Ill. A mile of 8-inch pipe line is now under construction to increase capacity into the holder station at La Grange.

A. G. Ford is general superintendent of the company, J. H. Owens, superintendent of construction and E. E. Lungren, chief engineer.

B. S. Pedersen Now Owner of Coos Bay Gas Co.

Ownership of the Coos Bay Gas Co., which serves North Bend and Marshfield, Ore., has passed to B. S. Pedersen. Mr. Pedersen's association with the West Coast gas industry dates back many years. For the past several years he has been with the American Stove Co. as San Francisco Peninsula representative.

Coos Bay Gas Co. was formerly the property of Lone Star Gas Co., Dallas, Texas.

Fisher Governor Head on Coast

J. H. Fisher, president of Fisher Governor Co., Marshalltown, Iowa, arrived on the Pacific Coast in December, on a two months tour which will take him over the Pacific Coast and Northwest, returning to Marshalltown by way of Mid-Continent states. Mr. Fisher, who is visiting district offices of his company, reports increased business from all western points and an excellent business outlook for 1935.

C. W. Hulse at Newberg, Ore.

C. W. Hulse has been made representative of the Portland Gas & Coke Co., at Newberg, Ore., succeeding C. L. Chase, recently transferred to the commercial department at company headquarters in Portland.

Automotive Engines for Stationary Service

(Continued from Page 14)

to make it endless, which can readily be done if a leather belt is used. When using a rubber belt this is not so easy as lacing or clamps of some kind must be used to make the splice. It is very important to make the splice as flexible and thin as possible so that it will not pound the pulleys, and there are patented clamps and lacing on the market for this purpose.

In setting the engine for belt drive it is quite important that the engine and pump pulleys be placed in proper relation to one another. (See Fig. 3.)

In the last year or two the multiple V-belt has come into considerable use, since it is more efficient and makes possible shorter pulley centers, especially where an idler is used. If new belt and pulleys have to be purchased it is recommended that the V-belt be given careful consideration.

In recent years several manufacturers have developed right angle drive geared pump heads for deep well turbine pumps, which make very compact and efficient drives. When it is necessary to have to change the pump head this drive should be given consideration.

Power Take-Off: The kind of power take-off depends upon whether the engine is to be direct connected or belted; also upon whether the transmission is to be left on the engine or taken off. In many instances it is advisable to leave the transmission on the engine as this gives the benefit of a good disconnect clutch and speedometer connection which is very convenient in checking on the speed of the engine.

When the transmission is left on there is sufficient shaft extension from which the power can be taken. When the transmission is removed a stub shaft must be fastened to the fly wheel of the engine from which to take the power.

When the engine is to be belted provisions must be made to relieve the bearings in either the end of the transmission or engine from the strains due to the belt pull. This can be done best by the installation of a short shaft mounted on two bearings, preferably ball bearings. The pulley can be mounted between the two bearings or it can be overhung, though mounting between the bearings make the better job. The shaft and bearings can be mounted in the engine frame if this is used or an additional pier can be built to carry the unit. A flexible coupling should be installed between engine and shaft.

Due to the difficulty of maintaining perfect alignment in installations of this kind it is advisable to use flexible couplings or universal joints where connections in equipment are made. Fig. 1 and Fig. 2 show coupling locations.

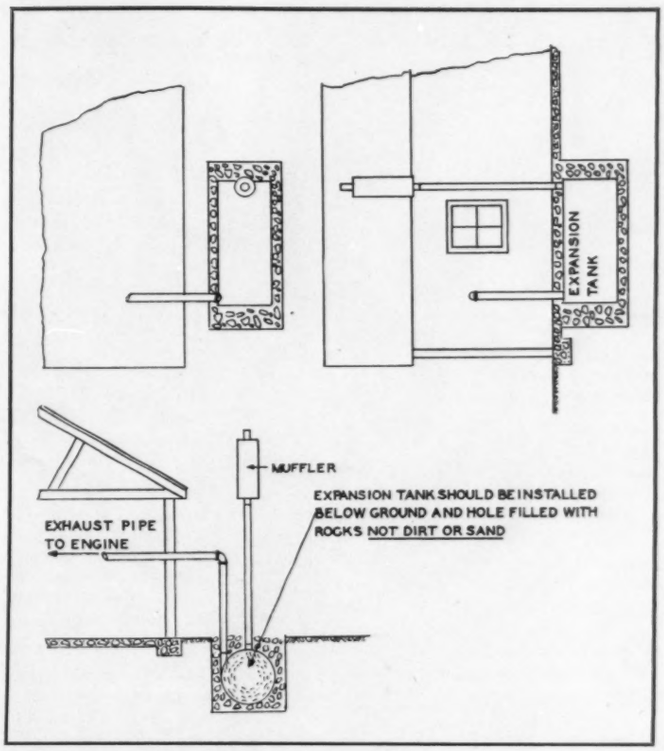

EXPANSION TANK
MUFFLER
EXPANSION TANK SHOULD BE INSTALLED BELOW GROUND AND HOLE FILLED WITH ROCKS NOT DIRT OR SAND
EXHAUST PIPE TO ENGINE

FIG. 6

General lay-out for exhaust muffling system.

Cooling System: The heart of a gas engine is its cooling system. The radiator that usually comes with an engine is not satisfactory for continuous operation, as it does not have sufficient cooling capacity. Use of radiators is not recommended where a fresh supply of cool water is available, as in the case of an engine used for pumping water for irrigation. However, there are certain installations, especially in industrial plants, where a radiator is most convenient; in these cases a special radiator of sufficient capacity must be installed.

For water pumping installations cooling of the engine is simple, as it is only necessary to pass part of the water pumped through the cooling water jacket of the engine, disposing of it after it has been used by turning it either into the line or the well.

Most waters contain a certain amount of lime which sometimes forms scale in the cooling water jacket of the engine, resulting in cracked cylinders or cylinder heads if not carefully watched. To avoid this it is recommended that an enclosed cooling water system be used on every engine installation, which will eliminate cooling water troubles if correctly installed.

By an enclosed system is meant one in which the cooling water that passes through the engine is used over and over again and is cooled by being circulated through a coil which is submerged in the water pump by the main pump. Fig. 4 shows a general arrangement where this cooling coil is installed in a weir box.

For installations where no weir box or other means is available for submerging the coil, and the water leaving the pump is under pressure, a coil can be built into a large pipe connected into the discharge line. The coil should always lay horizontal, as shown in Fig 4. If installed vertically, air locks might occur in the top of the coil.

Another and quite satisfactory heat exchanger can be made by building a water jacket around the discharge pipe of the pump, leaving about 1 inch between the pipes. This general arrangement is shown, with constructive details, in Fig. 5.

The cooling water and the water to be cooled should always flow in opposite directions as illustrated in Fig. 4 and Fig. 5.

All enclosed cooling systems require an expansion or make-up tank for the purpose of allowing the water to expand as it heats and also for the purpose of replacing any water that may have leaked out of the system, these tanks need only be from 5- to 10-gallon capacity. Installation details are given in Fig. 4.

Where it is desirable to be able to see how much water the cooling water pump is pumping, it is recommended to pump the discharge of the engine over and into the expansion tank, then have the water flow through the engine cooling water jacket by gravity. For this purpose the tank must be of sufficient height to force sufficient water through the jackets.

Muffler: An unrestricted exhaust is objectionable on account of the noise produced, and it is recommended that each engine be provided with an effective muffler. This will prevent complaints from neighbors and permits the operator to hear how the engine is performing.

On an engine developing a small horse power the ordinary automobile muffler will reduce noise sufficiently. Where it is desirable to keep the exhaust noise at an absolute minimum, an expansion chamber may be installed between the engine and the muffler, consisting of a well-built tank with a capacity of about 2 gallons per horse power of the engine load. On small horsepower loads a second-hand hot water boiler will do good service. Care must be exercised in the installation of these expansion tanks,

TABLE NO. 4. MAXIMUM NUMBER OF FEET HOUSE LINE CAN BE EXTENDED FOR GIVEN ENGINE HORSEPOWER AND PIPE SIZE

H.P. Load	Probable Max. Cu. Ft. Gas Required	¾-in.	1-in.	1¼-in.	1½-in.	2-in.
10	125	240	1000	3000	7500	30000
15	200	90	400	1200	3000	13000
20	250	60	250	750	1900	9000
25	300	40	180	500	1300	6000
35	425	....	100	270	700	2800
50	600	....	50	130	350	1500

Example: 10 H. P. load requiring 600 foot house line would require not less than a 1-inch pipe; 25 H. P. load requiring 800-ft. house line would require not less than a 1¼-inch pipe.

and the details given in Fig. 6 may be helpful.

Gas Mixers: Automotive engines are designed to operate on liquid fuels such as gasoline and distillate and are equipped with a carburetor for mixing the fuel with air in proper proportion.

When these engines are to be operated on natural gas a suitable gas mixer must be installed in lieu of the carburetor. While a home-made mixer can be produced it has been our experience that a factory-built one is not only better but cheaper, and there are a number of these on the market.

House Line: The company furnishing the gas for the engine ordinarily stops its service at the property line where the meter is set, and the consumer is required to extend his own house line from the meter to the engine. Gas is usually delivered at 8-inch water column pressure. Under these conditions the size house line required can be determined from Table No. 4.

Inasmuch as there is so little difference in the first cost between the different various sizes we recommend the installation of a larger size than the above table calls for. Pipes should be welded rather than screwed together. If on farm land they should of course be laid to such a depth that they will not interfere with plowing.

Lubrication: The selection of a proper lubricating oil is very important, as the wrong oil may mean excessive maintenance and shorten the life for the engine.

One of the products of combustion is moisture, which passes the piston rings and mixes with the lubricating oil to form an emulsion. In some oils this water stays in emulsion almost indefinitely while in others it settles out quickly. Certain oils under these conditions form a heavy sludge which produces stuck rings. Oils that have been dewaxed eliminate this trouble to a great extent.

Standard brands of lubricating oils in use for automobile engine lubrication, while they function well for what they are intended, are not satisfactory for the operating conditions under discussion.

An oil manufactured by most of the oil companies under the name of "turbine oil" has given exceptionally good results for automotive-type engines in stationary service.

Protective Devices: Failure in lubrication or in the cooling system of an engine is not of regular occurrence but rather the exception. In order to properly guard against this possibility it is recommended that protective devices be installed on every engine. Automatic devices are made that will shut down an engine before any damage is done when either the lubricating or cooling system fails. Some operate on the principle of pressure drop, and others on the basis of temperature rise.

Every gas engine should be equipped with a governor, to maintain constant speed when this is necessary and to prevent the engine from running away should the load be suddenly dropped. There are a number of these governors on the market that are inexpensive and that can be installed on the engine with very little effort.

Fall Circulating Heater Campaign in Full Swing

THE fall circulating heater campaign of the Gas Appliance Society of California, extending from November 17 to December 31, is the most extensive promotional program ever undertaken by the Society. This concentrated drive for heating business throughout central and northern California is using newspaper advertising and dealer displays as its principal promotional weapons, and finds the Gas Appliance Society engaging directly in newspaper advertising for the first time. The Society is spending approximately $4,000 on the program, the finances having been raised entirely through the "Sticker Plan." Under this plan, stickers have been sold for attachment to appliances, the cost being charged to promotional gas advertising and paid jointly by the distributor, the retailer and the Pacific Gas and Electric Co.

Special offer of the campaign consists of a $6 saving on the purchase of gas circulating heaters of several makes, regularly selling at $33.50 or more. Heaters must be installed not later than January 5, 1935.

Forty-eight-inch newspaper advertisements in approximately 60 key newspapers in cities and towns throughout northern and central California constitute the main feature of the campaign. The cost of this promotion is being financed entirely by the Gas Appliance Society, and tie-in advertising from the retail dealers is expected. Newspapers are being provided with clip sheets containing suitable publicity material with cuts, mats, etc. The opportunities of financing the purchase of circulating heaters under the Federal Housing Act is also being stressed in clippings, thus tying in with the promotional work already going on in this field. Finally, dealers are being supplied, free of charge, with attractive 20-inch x 30-inch easel-back posters in five colors giving a selling message on circulating gas heaters and carrying a banner calling attention to the special offer.

The cost of the $6 special inducement is being defrayed as follows: When the new heater is sold to replace a gas furnace, gas boiler, a gas floor furnace, a gas circulating heater or a radiant type gas heater installed in a fireplace, the $6 cost is being shared

Easel-back poster, 20 inches by 30 inches, to be supplied all retail dealers in fall circulating heater campaign of Gas Appliance Society of California.

equally by the retailer making the sale and the manufacturer or wholesale distributor. In other cases, the $6 cost is being split as follows: Pacific Gas and Electric Co., $3, manufacturer or distributor, $1.50, and retailer, $1.50.

Trial Plan Instituted in Large Size Space Heater Selling

The Gas Service Co., Kansas City, Mo., placed in effect during its fall house heating campaign an offer on large size space heaters similar to that made earlier on conversion burners. Any purchaser of large size space heaters during October and November was allowed until February 1, 1935, to determine whether he was satisfied with the newly installed equipment. Any dissatisfied purchaser on that date will have the privilege of returning the equipment, all money paid in on it being refunded by the company.

Cunningham, Kan., Has Natural Gas

Cunningham, Kan., received natural gas for the first time in October. The town is being served by the Kansas Power and Light Co. which headquarters in Salina.

Natural Gas for Bastrop, Texas

United Gas Public Service Co. late in October began service of natural gas in Bastrop, Texas.

THE NEW MINNEAPOLIS-HONEYWELL

ACCELERATING THERMOSTAT

PROVIDES EVEN TEMPERATURE
PLUS HEAT DISTRIBUTION

Automatic Compensation for All Heat Variables

TRUE heating comfort will do more toward creating public acceptance for gas heat than any other one factor. The new Minneapolis-Honeywell Accelerating Thermostat improves gas burner performance because it automatically compensates for and balances the effects of outside weather, differences in building construction, and most of the deficiencies in heating plants themselves. It precisely governs the length of burner opperation during the time heat is actually being distributed. By means of a small electric heating coil, or variable compensator, the action of the thermostat is accelerated after the downward trend of temperature has been checked. Then, when heat is actually being distributed, the accelerating thermostat governs the length of burner operation to insure proper distribution and also to prevent wasteful overheating. When the burner stops, the variable compensator gives up its heat slowly in accordance with the rate of temperature drop, to automatically govern the standby period. The new Accelerating Thermostat will enable users of gas heat to derive the fullest satisfaction from their equipment. Minneapolis-Honeywell Regulator Co., 401 East Twenty-eight Street., Minneapolis, Minn. Branch and distributing offices in all principal cities.

VARIABLE COMPENSATOR

A PLAIN PATTERN THERMOSTAT THAT AUTOMATICALLY GIVES PROPER LENGTH OF BURNER OPERATION TO PROVIDE HEAT DISTRIBUTION AND UTMOST COMFORT

MINNEAPOLIS HONEYWELL
CONTROL SYSTEMS

Inducement Rates as an Aid to Load Building

(Continued from Page 11)

cess of rate reduction could be repeated as many times as I have indicated.

But there are inducement rates which are soundly conceived and which do work toward betterment of the load factor. The class rates of the Pacific Gas and Electric Co., for example, are designed to encourage consumption by concessions in rates to fit the need of the consumer. The basis of such rates is that the consumers, in a clearly defined class, may be served at a lower rate, provided the additional revenue to be derived is something more than the additional cost of rendering the service.

Under this formula the domestic user of gas pays less for his service as his consumption increases within block limits; the owner of a large residential heating installation enjoys a special combination rate for domestic and heating use, without which he could not afford to operate his heating plant. Commercial building heating and firm industrial demand are accorded similar treatment—all upon the principle, long established as sound in utility practice, that the value of service is not the same to all classes of consumers. Some classes would not and could not pay the rates that others pay because the value of the service to them is too low, but the utility company can supply these classes with gas at lower rates so long as the cost of the added service is lower than the average cost.

These class rates are inducement rates in that they offer a premium upon consumption of gas or for increased consumption, which otherwise would not be undertaken. They have made possible the merchandising of large numbers of heating and other appliances, and on the other hand, the sale of that equipment has been the effective means of load building. You may take your choice as to which is the cause and which the effect, according to your business affiliations.

What further reductions can be brought about to stimulate a greater use of natural gas, and a more general adoption of gas-consuming appliances, must depend upon a number of factors which frequently are overlooked.

Not all companies can afford to give service at the same low rate. Each must build its rate structure upon the basis of conditions within its own field of activity.

The distributor of artificial gas is far more limited in possible rate reduction than the company that supplies natural gas. This is because the additional, or increment cost of production and delivering additional manufactured gas is only slightly less than the average unit cost. The opportunities of offering inducement rates are therefore much less with manufactured gas than they are with natural.

The distributor of natural gas has greater latitude. Pipe lines must be built large enough to provide for normal growth in demand and to meet the peak demand of the winter season. A substantial surplus supply must always be carried to provide a necessary margin of capacity for emergency use. Many persons not fully informed assume that a company having surplus pipe line capacity can profitably transfer its surplus supply to firm demand by the simple device of offering further inducement rate reduction. The facts that there is a wide seasonal variation in consumption in California, and that as firm demand increases, surplus supply or capacity must diminish, are frequently ignored.

In the case of Pacific Gas and Electric Co., volume sales of surplus gas in 1933 amounted to 44 per cent of the total sales for the year. This surplus is sold at reduced rates under special non-preferred contracts, which give the company the right to discontinue service even without notice whenever due to shortage of supply or other causes it is necessary to do so in order to meet the demands of the higher-priced users. Large industrial plants which can switch easily to other types of fuel equipment are the chief users of this service.

And last year, in spite of the fact that the total firm load amounted to but 56 per cent of the year's consumption, unusually cold weather on two separate occasions caused such an increase in gas use that the company was compelled to notify a considerable number of large surplus users of impending shut-offs. Whenever peak firm demand shall reduce surplus capacity below the margin of safety, then the company will be forced to invest new capital funds to increase its pipe line capacity. Rate reductions for promotional purposes must of necessity take into consideration this ultimate necessity and must allow for the additional cost of increased investment.

Let me give you a frank picture of the financial side of the gas business, the side which must carry the burden of material changes in rate structure. In 1933 my company earned 34.57 cents per thousand cubic feet for all gas sold after payment of expenses of operation, maintenance, taxes, depreciation and cost of natural gas purchased in the field. That represents the amount received as net return on the investment, out of which there had to be paid bond interest and dividends.

A net earning of 34.57 cents represents less than 7 per cent return upon the investment in gas properties. We have contended before the Railroad Commission and the Federal Court that the company is entitled to at least 8 per cent upon the investment if its financial position is to be kept sound and secure.

Consideration of new so-called inducement rates must take this financial picture into account. It is the foundation upon which rates must be built. The figures I have cited will make clear how narrow is the margin for cheaper gas unless very marked changes are brought in the character or distribution of consumers' demand.

The largest block of gas consumption, both in number of consumers and in quantity of gas used, is the domestic classification. There are encouraging indications of growth of demand in this field, especially for space and water heating. Figures recently issued by the United States Department of Commerce show how far below the saturation point is the home use of gas in typical American communities.

Two California cities were included in the 64 cities of the country that were covered by the Real Property Inventory conducted by the Commerce Department.

In Sacramento, out of a total of 36,505 dwellings surveyed, 29,404, or 80 per cent, were equipped with gas cooking facilities. In contrast to this large usage, only 12,424, or 34 per cent, used gas for heating.

In San Diego similar differences were reported. Out of a total of 63,695 dwellings, 59,355, or 93 per cent, were using gas for cooking, but only 29,058, or 45 per cent, were heated by gas.

If these figures may be considered as representative of California communities, we are unquestionably safe in concluding that there is still a rich potential field for the sale of gas heating equipment in this state. And in the majority of California towns and cities, especially those within the range of natural gas transmission mains, the rates asked for domestic usage already are at such a level that the householder may profitably install modern gas heating equipment and with an easy mind enjoy the solid comfort of a well-warmed home.

The gas industry has gone a long way on the road of rate reductions since that day 80 years ago when the pioneers of gold rush San Francisco were offered coal gas to light their homes at $15 per thousand cubic feet. Rapid increase of output and improvement of plant equipment of the little San Francisco Gas Co. quickly brought reduction of this high rate, and prices have been dropping ever since. Competition played its part in bringing about lower rates, but a far more important factor in bringing them down to present day standards was the enterprise, the energy and the foresight of the gas industry in making voluntary reductions which were in effect what we now refer to as inducement rates.

In this process of load building the improvements that have been made in the design and the efficiency of gas appliances, and the aggressive sales policies of manufacturers and dealers, have played a very important part. I think I may safely speak for all California gas utilities in expressing to manufacturers and dealers, alike, full recognition of their contribution to our mutual progress and prosperity, and appreciation of their cooperation. More and better gas appliances have paved the way for lower and more favorable rate schedules, with corresponding increases of consumers' demands. I look forward to further improvements and, with the continued whole-hearted support of all elements of the gas industry, to further great advances in this public service in which we are engaged.

E. A. Guenther Representing Metal-Bestos

E. A. Guenther, for many years connected with the gas appliance venting industry, has been appointed by the Payne Furnace & Supply Co. of Beverly Hills, Calif., as sales representative in Southern California for Metal-bestos gas vent and flue pipe.

General Ceramics Moves Offices

General Ceramics Co., manufacturers of acid-proof chemical stoneware, has moved its executive and sales offices into the R.C.A. Building, 30 Rockefeller Plaza, New York. This company's factories are located in Keasbey, N. J., and Metuchen, N. J.

On the news

Welsbach Company Views Future With Optimism

With Exploit Products in ... and cerium, drying ... and igniting to burn the thread ... and convert the nitrates into ... Exp... les ...

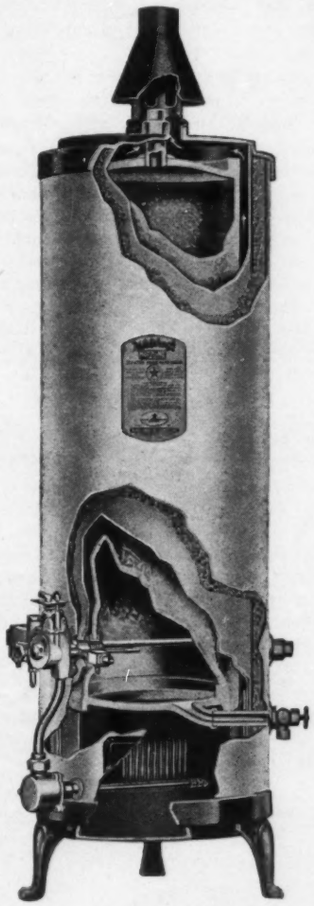
VISION PROSPERITY HERE IF PLANS WIN

Name of Firm Internation...

Established ... 1887, the oldest ... the Welsbach ... has ... ried on. Its ... has been splendent with ... nts, many of which have brought it and its individual

Welsbach, borne witne... death, sorr... ness, myster... the pious a... It has lent

MODERN GAS BURNING EQUIPMENT BY Welsbach



Welsbach, famous Reflex gas mantles (shown above). Millions have been sold. This first forward step in gas lighting was developed and manufactured in Welsbach Laboratories.

SEE THE NEW WELSBACH HOTZONE BROILER GRIDDLE

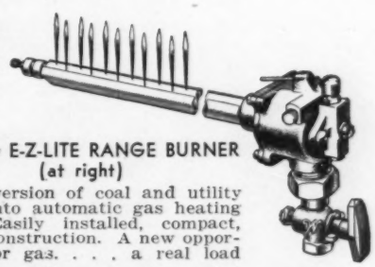
—with the patented HotZone Broiler Burner (shown below) . . . its INFRA RED RAYS give unsurpassed results. Cooks uniformly. Broils faster. Enriches foods. For restaurants, hotels, clubs.

WELSBACH HOTZONE SELF ACTING STORAGE GAS WATER HEATER (at left)

Exceptionally well built. A size, model and type for every individual need. Highly developed safety devices furnished. Market for this type equipment only 10% saturated.

WELSBACH SPACE HEATER No. 70

With E-Z-LITE BURNER and safety gas shut off (at left). Primarily for kitchen heating, adaptable to any "cold spot." Sturdy, attractive, efficient.



The New E-Z-LITE RANGE BURNER (at right)

For conversion of coal and utility ranges into automatic gas heating units. Easily installed, compact, lasting construction. A new opportunity for gas. . . . a real load builder.

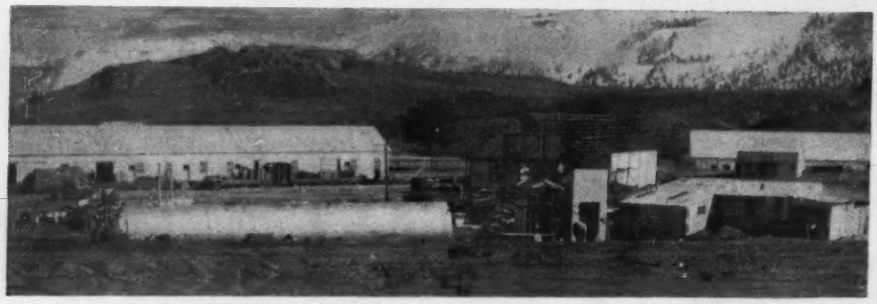
Welsbach

Since 1887, pioneers in the manufacture of Gas Burning Appliances

The Welsbach Company, Gloucester City, N.J.

Branches in Principal Cities

BUTANE-PROPANE NEWS



AT THE LEFT:

West Portal Camp on the Mono Basin tunnel project in California. In the foreground is the 10,000-gallon butane storage tank, with gas house and water heater house at right of tank.

Undiluted Vapor Plants at Mono Basin Camps

UNDILUTED vapor type gas plants are now installed at four camps on the Mono Basin project of the Los Angeles Department of Water and Power. Three of the plants went into operation in November and the fourth early in December. Parkhill-Wade, Inc., of Los Angeles installed the plants and is supplying them with butane-propane.

Through the Mono Craters a 13-mile tunnel is being constructed, bringing water from the west side of the range into Owens Valley to join the present Los Angeles Acqueduct. The four camps, known as West Portal, Shaft One, Shaft Two, and East Portal, are located along the 13-mile construction front, from 3 to 7 miles off the main highway. Elevation ranges from 7,000 to 8,500 feet and weather conditions vary from 20 degrees below zero in winter to upwards of 100 degrees in summer.

The camps are of permanent construction, since the job will require three years for completion. They differ in size, accommodating from 150 to 250 men each.

A 3,000 B.t.u. average mix will be distributed from the gas plants, the winter mixture including sufficient propane to prevent line condensation.

Parkhill-Wade type plant units are installed, a feature of this design being that all pressure reduction is effected on the vapor side. While the vaporizers are nominally rated at 2 M c.f. per hour of undiluted gas, tests at the plants show 3 M c.f. per hour capacity. Two of the camps have 10,000-gallon storage, and two 20,000-gallon storage. Fuel deliveries are made from Los Angeles Basin 370 miles distant, using a 5,000-gallon fuel tank mounted on a semi-trailer.

Butane-propane will handle the building heating load, as well as supplying heat for steel treating, sharpening and tempering tools at the blacksmith shop.

Dormitories at the camps are wooden frame buildings, 20 rooms each, two men to the room. Each dormitory is equipped with two motor-driven circulating heaters, with an air duct system to each room and an automatic recirculating system drawing in proportioned quantities of fresh air. Temperature is kept at 70 degrees 24 hours a day. Each room has an air register.

Thermostatically controlled console-type heaters are used for heating mess houses, recreation buildings, family cottages, warehouses, compressor houses, and miscellaneous buildings.

Paulsboro, N. J. Converts from Water Gas to Butane

AT Paulsboro, New Jersey, where a municipally operated enriched water gas plant has supplied gas service, a change-over to air-butane was made last month. The Selas Co. of Philadelphia was responsible for design and installation of the butane central plant, which began operation on November 2.

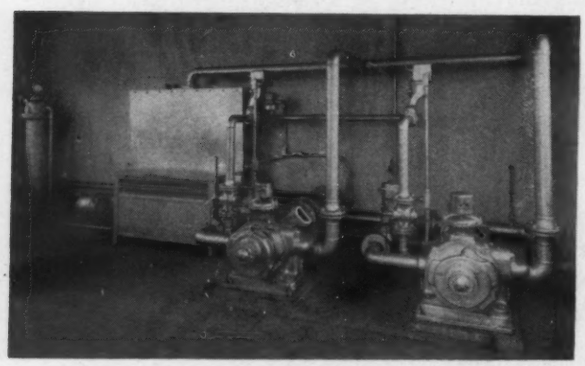
The system serves 1,400 meters, and because of existing mains and gas holder the distribution is at low pressure. Gas manufacturing capacity is 7,000 cu. ft. per hour, and storage of 50,000 cu. ft. is provided. A maximum hourly demand of 20,000 cu. ft. has been experienced on the system.

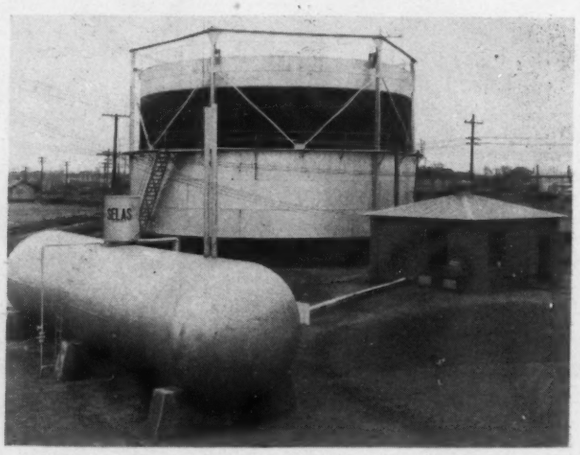
Vaporization of the butane is fully automatic, taking place within the fuel storage tank, the Selas vaporizer being actuated by pressure drop in this tank. Steam, supplied by an automatic gas-fired boiler, is the indirect heating agent for winter operation. In cold weather the boiler also maintains temperature of water for the holder and supplies building heating.

With this type vaporization no liquid is removed from the storage tank at any time, and one-stage regulation may be accomplished satisfactorily; however, a duplicate regulating set-up is provided as a safety factor at the Paulsboro plant.

Two Selas Type M mixing machines, operating on the volumetric principle, provide the gas-air mix. Passing through a heat exchanger unit the air and vapor enter

ILLUSTRATIONS: A general view of the Paulsboro plant, with butane storage in the foreground and gas house at the right; and a view of the mixing room.





the machine at the same temperature. The machines discharge directly to the boiler, which they charge automatically. Actuation is through limit switches at the 43,000 and 49,000 cu. ft. marks. Should the holder be lowered for repair the machines are connected to discharge directly into the line.

Plant control apparatus makes butane-vapor supply automatic, shuts down the plant if butane supply fails and actuates an alarm signal. The plant also shuts down automatically, and an alarm operates, if the heating value deviates. Motor-operated valves prevent escape of gas from holder or from butane line, in event of shut down. When the holder is full the plant equipment will not function.

To Make Butane-Air Directly Into Mains at Needles

Needles (Calif.) Gas & Electric Co., which recently converted its plant to butane-air, plans to add three new Gasair machines. The machines, manufactured by the Utility Development Co., San Francisco, will make 900 B.t.u. butane-air gas directly into the mains, and are also being designed to handle odorizing and oil or water fogging. With the mixing equipment charging directly into the distribution system, the plant will be independent of electric or other power for its operation. The Gasairs will be actuated by a slight pressure drop in the distribution mains and will shut off when pressure has been built up to normal.

Undiluted Propane Service Subject of Central Plant Bulletin

The Philgas Department of Phillips Petroleum Co. has issued a new bulletin, No. 44, on the subject of "Propane Gas Service for Small Cities." Distribution of undiluted propane through pipe lines is covered in some detail, with flow sheets and photographs showing typical central plant properties. Discussed in the new bulletin are such headings as plant equipment, estimated plant and distribution system costs, plant operation, utilization in appliances.

L. H. Spiner Promoted with Shell

L. H. Spiner, a former manager of the Shellane department, has been made manager of the sales promotion and advertising departments of Shell Oil Co. He replaces Paul Ryan, who has resigned from the Shell organization. Mr. Spiner until his recent advancement, was assistant manager of the department he now heads.

New Jersey Marketer Expands Field

Natural Gas Co. of New Jersey, Hammonton, N. J., marketing bottled gas in the southern portion of New Jersey, will soon expand its activities to cover the area around Philadelphia, Pa., and south from Philadelphia as far as the northern parts of Maryland and Delaware. Mr. Samuel Kapnek is manager of the organization.

Skelgas Co. Starts Sales Drive

A 26 weeks' sales campaign has been opened by Skelgas Co. An outstanding feature will be a weekly broadcast over station WGN, Chicago.

MOST POPULAR OF ALL

Hackney Liquefied Petroleum Gas Cylinders are preferred for their uniform quality, and superior design. Built by Pressed Steel Tank Company with long and wide experience in the design and fabrication of cylinders for many uses.

Hackney cylinders for Propane, Butane and Butane-Propane mixtures are not only popular—*they dominate the field.* There are twice as many in service as all others combined.

They serve such leaders as—Shell, Standard, Skelly, Phillips, Lone Star, and others. They are the "buy" of the field.

Pressed Steel Tank Company
208 S. La Salle St. Bldg., Room 1185, Chicago, Illinois
6633 Greenfield Ave., Milwaukee, Wisconsin
1363 Vanderbilt Concourse Bldg., New York, N. Y.
666 Roosevelt Bldg., Los Angeles, California

Hackney MILWAUKEE

CONTAINERS FOR GASES. LIQUIDS AND SOLIDS

VERSATILE

In addition to its regular functions of mixing butane and air automatically, supplying economical town service and providing inexpensive repair or change-over units, the "GASAIR" BUTANE MIXER is inherently useful as:

OIL-FOGGER • HUMIDIFIER • ODORIZER

Write for detailed information and prices.

"GASAIR" Butane Mixer

Utility Development Co. (John K. Heller, President)
5815 Third Street, San Francisco

Second Edition, Handbook of Butane-Propane Gases

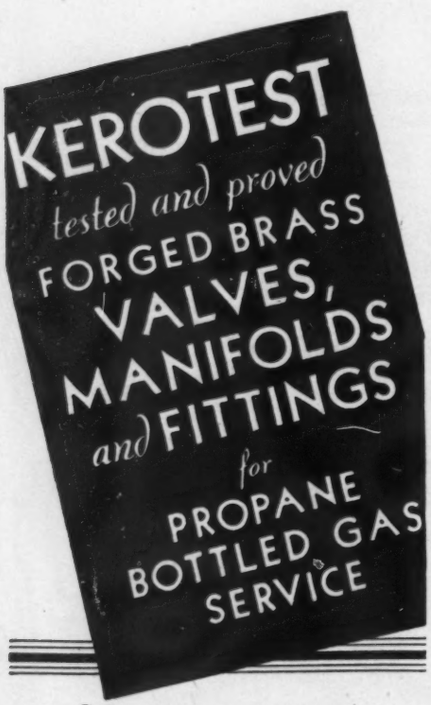
SCHEDULED for publication late in December, the Second Edition of the Handbook of Butane-Propane Gases will cover changes in practice and new developments in the industry during the past two years. New contents of the second edition are covered in some detail on page 39 of this issue. They include subject matter on such significant phases, not covered in the first edition, as the use of liquefied petroleum gases in internal combustion engines, design and installation of storage facilities for these gases, engineering data on the lower olefins, manufacture of liquefied petroleum gases at refineries, and the competitive position of these gases.

In view of changing practice, several of the original chapters have been completely rewritten. Among these are the sections on central plants, appliance testing and utilization, and bottled gas distribution.

Other important additions include tables on volume correction factors extending through the propane range, charts on properties of commercial mixtures, bibliography additions covering the extensive literature of the past two years. The revised central plant directory lists the permanent construction camp plants as well as new towns now served. Foreign activity in butane-propane manufacture and sale is also covered in the new Handbook.

The new edition is considerably larger than the original one, containing upwards of 400 9- by 12-inch pages and several score new illustrations. Basic reference material from the first edition is retained in the new issue.

The Handbook of Butane-Propane Gases is published by *Western Gas*, 810 South Spring Street, Los Angeles, Calif. Copies of the Second Edition are priced at $5 each.



Write for descriptive circular

KEROTEST MFG. CO.
PITTSBURGH, PA.

KEROTEST

Kerrville to Operate Municipal Butane-Air Distribution System

Only bidder for the properties of the Kerrville (Texas) Gas Co., which were sold at public auction on November 6, was the City of Kerrville, with an offer of $35,000, the minimum set by the 94th District Court. Sale of the properties is now awaiting formal Court approval.

The properties comprise a butane-air system, which it is planned to move to the property of the Water Works, combining the operation and management of the two utilities.

E. H. Kifer, consulting engineer of San Antonio, Texas, has been retained by the City to advise on improving and modernizing the plant, according to A. P. Hancock, city manager and city engineer.

Mesa Preparing for Natural Gas; Butane Standby Installed

Construction of the natural gas pipe line from Phoenix to Mesa and Tempe, Ariz., began late in October, with actual service scheduled to start December 1. The cost of laying the line is approximated at $30,000, 30 per cent of which is a P.W.A. grant.

Installation of butane storage in connection with introduction of natural gas service is being made at Mesa, according to G. I. McFarland, general superintendent of utilities for the City of Mesa. Butane-air mixing apparatus may be added at a later date, if it proves that standby service is needed. For the present the 15,000 gallon butane tank is being used for gas storage.

Muskegon Consumers Now On Natural Gas Service

Natural gas was turned on in the city of Muskegon, Mich., November 12, through the 55-mile, 8-inch line originating in the Austin pool in Mecosta County. All users were expected to receive the fuel shortly after the 15th of the month.

American-Michigan Pipe Line Co., subsidiary of the American Light & Traction Co., will operate the line, with the Muskegon Gas Co., affiliated with the same interests, distributing the gas in Muskegon. United Light and Power Engineering and Construction Co. had charge of laying the line.

G. W. Bach Managing Skelgas Co.

Skelgas Co., Kansas City, Mo., announces the appointment of George W. Bach, formerly assistant manager, as manager succeeding Milburn Hobson who has resigned. Mr. Bach has been a member of the Skelgas organization for six years.

Testing Lean Absorption Oil Subject of C.N.G.A. Bulletin

The California Natural Gasoline Association announces publication of a 72-page bulletin, No. 343, "Tentative Standard Procedure for Testing Lean Absorption Oil." The bulletin is the product of two years of intensive study by the C.N.G.A. Committee on Absorption Oil Testing, under the chairmanship of H. J. Multer of the Union Oil Co. The bulletin treats such tests as: A.P.I. gravity; Engler and Hempel distillations; vapor pressure; molecular weight; viscosity; gum content; water and sediment; acid and alkali shrinkage; and demulsibility. Copies may be had at 25c each, postpaid, through the C.N.G.A. Secretary, 1217 Associated Realty Building, Los Angeles, Calif.

Palo Alto Completes Butane Standby Plant

The butane standby plant under construction by the city of Palo Alto, Calif., was expected to be completed by November 30. The plant was erected at an approximate cost of $22,500. Butane will be introduced into the natural gas system at times of peak demand.

The building which will house the plant has been designed in the Spanish California residential style with stucco finish and tile roof. Its walls and ceiling are being covered with celotex to deaden sounds. As the plant is located within a residential section the city is landscaping the property to make the setting as attractive as possible.

Wisconsin Rapids Gas Co. Adds Biron to Towns Served

Wisconsin Rapids (Wis.) Gas Co. has been granted a franchise to serve liquefied petroleum gas in the village of Biron, Wis. Since the company began operations late in 1933 the following communities have been added to its system: Plainfield, Hancock, Coloma, Friendship, Adams, Pittsville, Port Edwards and Nekoosa, Wis. Fuel is unloaded into large storage facilities at Wisconsin Rapids, and from there delivered by truck to smaller storage tanks in each of the several towns served. Undiluted vapor-type plants are operated by the company.

Type "P" Reliance Regulator Covered in New Bulletin

Reliance Regulator Corp., Alhambra, Calif., recently published its Bulletin No. 34, devoted to its Type "P" regulator. The bulletin incorporates a number of photographs showing stream flow characteristics of this type regulator, together with details of construction, and graphic records of its performance. The new bulletin is issued in conjunction with Reliance's Bulletin No. 32. Copies of both bulletins may be had from the company.

Trade Practice Complaints Committee

The National Recovery Administration has approved the following appointments to a Trade Practice Complaints Committee for the liquefied gas industry: J. J. Callahan, Hi-Heat Gas Co., New York; Mark Anton, Suburban Gas Co., Verona, N. J., and L. H. Spiner, Shellane Division, Shell Petroleum Corp., St. Louis.

Seattle Staff Changes Follow Jones' Resignation

J. EARL JONES, commercial manager of the Seattle Gas Co. since November 1, 1930, and before that time assistant sales manager for the Portland Gas and Coke Co., left the utility field in November to become president and general manager of the P & C Hand Forged Tool Co., Inc., of Portland. Mr. Jones has had a financial interest in this automotive specialty tool company for several years.

Following Mr. Jones' resignation James F. Pollard, vice-president and general manager of the Seattle Gas Co., has announced a number of organization changes, involving promotion of company staff members. The Seattle sales department will hereafter consist of two divisions, Domestic Gas and Appliance Sales, and Commercial and Industrial Sales. The former department will be under the direction of Norbert O. Fratt who for the past two years has been collection and credit manager for the company. During this period in that position Mr. Fratt reduced average losses on uncollectible accounts from approximately 3 per cent to less than 1 per cent. From 1930 to 1932 he was assistant sales manager under Mr. Jones' direction, and prior to that time was a district salesman. He will carry the title of domestic sales manager in his new work.

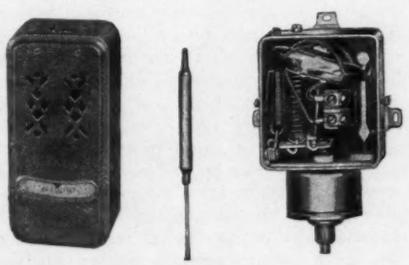
The Commercial and Industrial Sales Department will be under the direction of Ray Trowbridge, who has specialized in that branch of the company's business under Mr. Jones' general supervision for the past five years, prior to which time he was industrial sales manager for the Pacific Gas and Electric Co.'s San Francisco Division. Mr. Trowbridge will have the title of commercial and industrial sales manager.

Problems of mutual interest to the two branches of the sales department will be handled by a sales council consisting of Mr. Trowbridge and Mr. Fratt, under the chairmanship of George R. Horning, who has recently come to the Seattle Gas Co. as its general superintendent and engineer, and whose past experience includes engineering training with the United Gas Improvement Co., management of the gas properties at Macon, Georgia, management of the gas company at Salt Lake City, Utah, and general supervision of all gas properties of the Central Public Service Corp.

The vacancy left by Mr. Fratt's promotion from the management of the Credit and Collection Department will be filled by M. W. Gibson, who served in the capacity of assistant credit and collection manager under Mr. Fratt. Prior to the time Mr. Gibson came to the Collection Department of Seattle Gas Co. in 1930 he was employed in that department of the Portland Electric Power Co. in Portland, Oregon.

New Humidity Control Equipment Added by Minneapolis-Honeywell

Minneapolis - Honeywell Regulator Co., Minneapolis, Minn., has developed two new products to govern relative humidity differential between inside relative humidity and outside temperature. The new instruments



are a modulating or potentiometer-type humidity controller, seen above, operating in conjunction with an outside temperature controller of remote bulb type, also illustrated above. The humidity controller governs the supply of moisture at the relative humidity specified by the controller setting. When the outside temperature begins to drop the remote bulb temperature controller, the bulb of which is outdoors, through its electrical connection with the humidity controller, acts as a limit control; that is, as the outside temperature goes down the temperature controller affects the operation of the humidity controller, causing it to call for less moisture and preventing a condition of over-humidity with resultant condensation or frost on the windows and outside walls.

Territory Representation Changes for American Stove Pacific Sales Division

E. P. Millikan, manager of American Stove Co.'s Pacific Sales Division, has announced two changes in territorial sales representation.

Louis L. Meier who has previously covered towns served by the Southern California Gas Co. in the San Joaquin Valley, together with Bakersfield and Taft, effective December 1 will take over the San Francisco and Peninsula territory, formerly covered by B. S. Pedersen. Mr. Pedersen, as announced elsewhere in this issue, has purchased the Coos Bay Gas Co., serving Marshfield and North Bend, Ore.

R. W. Campbell will cover the territory formerly handled by Mr. Meier.

Roush Transferred to St. Joseph

Wendell Roush, engineer of The Capital Gas and Electric Co., Topeka, Kan., has been transferred to the St. Joseph (Mo.) Gas Co., in the same capacity, succeeding C. E. Taylor, resigned.

Upland Gas Offices Moved

Southern Counties Gas Co. has moved its location in Uplands, Calif., to 231 East 9th St., where a floor display of gas appliances and house heating equipment has been added.

Home Service Dept. for Enid

Oklahoma Natural Gas Co., is now operating a home service department at its Enid office, in charge of Miss Doris McKnight.

Calendar

December

Southern California Meter Association—Monthly Meeting, Lakewood Country Club, Long Beach, Calif., December 20.

January, 1935

Midwest Industrial Gas Sales Council—Palmer House, Chicago, Ill., January 17.

Southern California Meter Association—Annual Hi-Jinks, January 26.

American Society of Heating and Ventilating Engineers—Annual Meeting, Buffalo, New York, January 28-30.

March

Oklahoma Utilities Association—17th Annual Convention, Biltmore Hotel, Oklahoma City, Okla., March 12-13.

April

Mid-West Gas Association—30th Annual Convention, Hotel Fontenelle, Omaha, Neb., April 15-17.

May

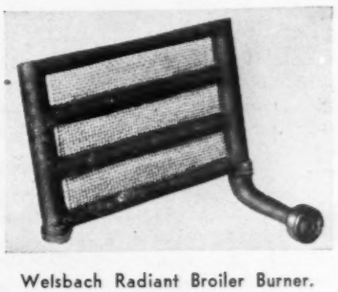
A. G. A. Natural Gas Department—Hotel Peabody, Memphis, Tenn., May 6-9.

Pennsylvania Gas Association—1935 Annual Convention, May 7-9.

National Fire Protection Association—1935 Annual Meeting, Atlanta Biltmore, Atlanta, Ga., Week of May 13.

Welsbach Radiant Broiler Burner Licensed to Stove Manufacturer

Welsbach Co. has entered into a contract with Roberts & Mander Stove Co. of Philadelphia, licensing the latter to manufacture, use and sell the Welsbach patented Radiant Broiler Burner on its domestic gas ranges.



Welsbach Radiant Broiler Burner.

This radiant broiler burner is provided with Nichrome grids which the gas flame heats to a temperature that will produce long-radiant and infra-red rays. These rays have great power of penetration so that food to be broiled is thoroughly cooked by radiant heat to a uniformity not possible under ordinary conditions. This type of broiler burner has been in successful use for the past two years.

MEASUREMENT and CONTROL

Selecting the Proper Meter to Measure Large Loads

By JAMES L. GRIFFIN

Northern Natural Gas Company
*Omaha, Nebraska**

THE principal types of meters used for measurement of large volumes of gas are the large capacity positive meters, the proportional, and the orifice meter. The use of proportional meters has been abandoned during the past few years because of the high initial and maintenance cost. The type which is used is determined by the limits of accuracy, initial costs, maintenance cost, and characteristics of the gas.

The fundamental principles of these various types of meters will not be entered into at this time, having been covered by previous papers.

Accurate measurement of gas to consumers is of paramount importance to the gas company as well as to the consumer. Since gas rates are based on the cost of other competetive fuels, the inaccurate measurement of gas to industries will result in a loss to the gas company or an increased cost to the consumer which would cause him to change to some other type of fuel.

The first point to be settled in planning the measurement of gas to a consumer is the type of meter to be used. A meter must be mutually agreeable to the buyer and seller.

In designing the measuring station consideration must be given to:

1. The pressure at which the gas is to be measured.
2. The available space for the meter installation.
3. The type of meter mutually agreeable.
4. The quantity and quality of the gas to be measured.
5. The load ratio.

The first point is obviously decided by the pressure on the seller's system at the point of delivery. If the sale is to be made from a high pressure or a so-called "intermediate pressure line," then either an orifice meter, or a positive meter with attachments to compensate for the pressure above the previously contracted base pressure may be used. Should the delivery be made from a low pressure line in which only a few ounces of pressure are carried, the measurement would have to be made through either a single or a battery of positive displacement meters.

Sufficient space must be available to comfortably accomodate the type of meter used, permitting the testing and repair work that may be necessary, without interruption to service or recourse to the expensive method of moving the meter to a repair shop. The space may be sufficient to accomodate a positive meter but would not permit its testing and repairing without removal. Available space may not be sufficient to install an orifice meter with the traditional horizontal runs without employing short pipe runs and running the risk of interference by regulators, fittings, and numerous other conditions that might affect measurement accuracy.

Cost of the installation will also be a big factor in deciding upon the type of meter mutually agreeable to both the buyer and seller.

The quantity and quality of the gas to be measured must be considered in selecting a meter with the proper capacity, and if the gas is of a highly corrosive nature, meters made of noncorrosive materials must necessarily be used.

The load ratio is of prime importance in any measuring station. In many manufacturing processes a very small volume of gas will be used during part of the process, and comparatively large volumes used in other parts of the process. If a positive meter is selected to measure the average requirements of a widely varying load with a maximum requirement larger than the rated meter capacity, it will obviously be broken or subjected to terrific wear during the period of peak load requirements.

Special attention is called to the use of positive meters on high pressure lines. When a valve is opened suddenly, permitting high pressure gas to enter the meter or gas which is under compression in the meter to suddenly leave the meter, the pressure acting on the diaphragm is greatly increased and produces a shock that may rupture the diaphragm or even break the middle meter partition. The probability of damage due to this cause may be eliminated by placing an orifice in the line adjacent to the down stream side of the meter. These orifices should be of a size that will not permit a volume of gas to pass in excess of the maximum meter capacity.

Another feature to be considered in the measurement of high pressure gas with positive meters is that the differential across the meter increases in the same proportion as the pressure increases, providing the dial reading remains the same. If a positive meter is operated at a dial rate of 1,000 cu. ft. per hour with 2 inches of water pressure differential at atmospheric pressure, this same meter when operated at a dial rate of 1,000 cu. ft. with the meter under a pressure of 75 pounds absolute will have a differential of 10 inches across the meter. This increase of differential pressure will produce additional friction on the valves and other working parts; therefore, the meter accuracy will not be maintained at the same standard as though it were operated at a lower differential pressure. A very satisfactory rule to follow when selecting a positive meter to operate under pressure, is to select a meter of such size that the hourly peak demand dial reading rate at 50 pounds of pressure is no greater than the dial reading rate for atmospheric pressure for ½-inch water differential.

If an orifice meter is selected and a disc to measure the average requirements installed, the mercury will probably be blown from the meter or a large volume of gas delivered without measurement because of the differential across the disc exceeding the maximum meter differential range.

In making the selection of a meter if it is decided that a positive meter operating at a pressure above the contracted pressure base will fit all requirements, the industry is occasionally faced with the problem of satisfactorily explaining to the customer the necessity for applying factors to correct the measurement from high pressure to the contracted pressure, as many consumers are unable, or not desirous of understanding why the difference in meter readings is not equal to the volume of gas consumed. This has been satisfactorily accomplished by the use of compensating attachments which show the final reading in cubic feet without the application of pressure factors.

In most instances, the use of an orifice or positive meter with standard equipment will secure an accurate measurement and will be found entirely satisfactory to the buyer and seller. However, there are instances where it is necessary to install additional instruments to automatically cut in additional meters to handle the peak load requirements.

In orifice meter installations of this type, one meter run can be designed to operate so as to accurately measure the average requirements, with additional meter runs to be automatically cut in for the measurement of the peak requirements. Similar arrangements can be made with combinations of positive and orifice meters, but where positive meters are used, it will be necessary to employ additional instruments for controlling and operating the valves on the secondary meter runs.

The rate of flow through an orifice meter is proportional to the square root of the differential. Its minimum capacity is limited by the accuracy of the observation of low readings on the chart so that for any particular orifice its range of maximum to minimum is approximately 3.5 to 1.

In the selection of a meter, if it is found that one of the larger capacity positive

*Presented at the Mid-West Gas School and Conference, held at Ames, Iowa, November 12-15, 1934, by the Engineering Extension Service of Iowa State College and the Mid-West Association.

meters is too small to handle the load during peak requirements, and an orifice meter is selected, and the load ratio exceeds the limits of a single range instrument but is not sufficient to require the use of additional runs with automatic limit controllers, then the wide range meter may be installed.

A meter should be selected with a static spring with a maximum range equal to twice the operating pressure, as such ranges will produce longer life and greater accuracy of the spring. The differential range of the meter selected should not exceed the absolute operating pressure in pounds per square inch.

Exhibitors' Night Draws Good S. C. M. A. Attendance

EXHIBITORS' NIGHT, an annual event with the Southern California Meter Association, was held on November 22 in the auditorium of the Los Angeles Gas and Electric Corp. Building, Los Angeles. The dinner meeting of the Association, held in conjunction with the exhibits, was attended by more than eighty members and visitors. H. W. Geyer, utilization engineer, of the Southern Counties Gas Co., was the speaker of the evening, and gave a highly interesting running review of unique industrial gas applications, with comments on utilization problems met and solved in modern natural gas industrial engineering.

Exhibitors' Night was apparently homecoming meeting for S. C. M. A. past presidents, all of whom were on hand at the meeting, being briefly introduced by President Edgar Wilde.

Exhibits this year were limited to associate members of the S. C. M. A., and practically all member firms took advantage of the opportunity to show their latest equipment. New types of flow meters, orifice meters, regulators and fittings, and various scientific equipment, were featured in the fourteen individual company exhibits.

Frank Colton of the Associated Oil Co., chairman of the Entertainment Committee, was in charge of arrangements for both the exhibits and the dinner meeting, and with the aid of his committee staged one of the most enjoyable meetings of the kind yet held by the Association.

December Meeting

The Association's December meeting will be at the Lakewood Country Club near Long Beach, Calif., on December 20. B. M. Laulhere will have charge of program events, which will be sponsored by the Southern California Gas Co. A principal topic will be "Dehydration of Natural Gas."

Hi-Jinks Date Set

Another occasion looked forward to on the Association calendar is the Annual Hi-Jinks, which has been dated for January 26.

Golf Results

In the Association's Jubilee Golf Tournament, held on October 27, winners were the following:

S. C. M. A.-*Western Gas* Good-fellowship Trophy (awarded for low net among the twelve winners of monthly S. C. M. A. tournaments): Won by F. J. Colton. Entertainment Chairman Colton ran off the tournament, and still managed to turn in a 75 gross, which brought him low gross for the tournament, as well as permanent possession of the trophy.

Second low gross: H. G. Andrews, Southern California Gas Co.

Low net: George W. Owens, Ducommun Corp.

Second low net: H. C. Dahl, Midwest Piping & Supply Co.

Longest drive from first tee: A. W. Seymour, Non-Corrosive Products Co., Ltd.

Low score on 3-par holes: Tied between Gordon Greene, Associated Oil Co., and F. S. Burt, General Petroleum Corp.

Low score on 5-par holes: E. S. Fuller.

To A. E. De Burn of American Liquid Gas Co. went consolation prize for high gross (117).

Blind Bogey was won by H. Nobel.

Prizes will be distributed at the December 20 meeting.

Appointed Assistant Manager American Meter Company, Boston

A. McW. Wolfe

American Meter Co. has announced the appointment of A. McW. Wolfe as assistant manager of its Boston factory, The Nathaniel Tufts Meter Works.

Mr. Wolfe entered the employ of American Meter Co. with the Maryland Meter Works in Baltimore immediately after the war in 1919, and his fifteen years of experience, since that date, in manufacture and in all phases of gas measurement, under the varying conditions of practical application, supply an excellent background for his new work. He is a graduate of Johns Hopkins University.

GAS COMPANY OPERATIONS FOR THE STATES OF CALIFORNIA, ARIZONA, NEVADA, OREGON AND WASHINGTON AND THE PROVINCE OF BRITISH COLUMBIA

Nine Months Ending September 30, 1934 Compared with Similar Period in 1933

THE following statistical statement, prepared by the Pacific Coast Gas Association, compares gas company operations for the first nine months of 1934 with operations during the same period in 1933 in P.C.G.A. territory.

A comparison of the summary below with those for the first and second quarters of the year, as published in *Western Gas* for September, 1934, indicates that business has continued to improve during the third quarter. Detailed figures for the various states of the Association are available at P.C.G.A. headquarters.

	1933	1934	Per Cent Change
Production—M c.f.			
Water Gas	1,702,822	1,646,523	
Coal Gas	521,075	366,837	
Oil Gas	3,310,758	2,511,465	
Coke Oven Gas	1,248,108	1,295,027	
Butane Gas—550 B.t.u.	169,829	150,166	
Natural Gas Purchased	107,685,314	119,291,207	
TOTAL	114,637,906	125,261,225	+ 9.3%
Active Meters—September 30			
Domestic	1,513,111	1,546,086	+ 2.2%
Commercial and Industrial	70,763	74,313	+ 5.0%
TOTAL	1,583,874	1,620,399	+ 2.3%
Sales—M c.f.			
Domestic	46,246,409	38,732,404	—16.2%
Commercial and Industrial	41,020,578	52,261,335	+27.4%
Steam-Electric Generation	10,679,703	18,522,757	+73.5%
TOTAL	97,946,690	109,516,496	+11.8%
Gross Revenue			
Domestic	43,371,276	37,971,600	—12.5%
Commercial and Industrial	11,111,846	12,466,417	+12.2%
Steam-Electric Generation	1,246,958	2,282,913	+83.1%
TOTAL	55,730,080	52,720,930	— 5.4%

COMMITTEE:
DOUGLAS BUCKLER...SO. CALIF. GAS CO.
J. EARL JONES.....SEATTLE GAS CO.
A. C. JOY (CHAIRMAN).....P. G. & E.
D. L. SCOTT.....L. A. G. & E. CO.
PIERRE VINET.....C. C. G. & E. CO.

1934 P·C·G·A

HEADQUARTERS:
PACIFIC COAST GAS ASSOCIATION
447 SUTTER STREET, SAN FRANCISCO

WM. MOELLER, JR., PRESIDENT
CLIFFORD JOHNSTONE, MNG. DIRECTOR

CO-OPERATIVE MONTHLY NEWS
LOAD-BUILDING ····· AND VIEWS

Technical News Service Does CONSTRUCTIVE JOB

WHILE returns for 1934 are not all in, indications are that our Technical News Service, supplying articles to Coastwide trade journals, will exceed past records this year. Added to results already reported, the following articles were published to November 1:

ARCHITECT & ENGINEER — *Gas Engineers' Handbook.* Introduction of technical manual by P.C.G.A. • *Dehumidifying Air.* Acquisition of gas-fired air conditioning by Bryant Heater Co. • *Heating Problems Solved.* Immersion gas firing at Continental Health Club, San Francisco.

PACIFIC LAUNDRY JOURNAL—*Boiler Plant Efficiency.* Evaporation tests. • *Xclusive Laundry, Stockton, Calif.* Combustion efficiency of 82 per cent secured with gas-fired steam boiler plant. • *Boiler Plant Efficiency.* Gas Fuel Regulators.

WESTERN RESTAURANT — *Know Your Cooking Equipment* • *Al Levy's Tavern Sets New Catering Standards.* One of first Los Angeles restaurants to cook with gas. • *White Log Cabins* Standardized cooking equipment gas-fired throughout.

PACIFIC COAST RECORD—*Efficiency in the Kitchen.* Selection of efficient modern equipment; gas company cooperation. • *Unit Cooking Tests.* Cost and fuel records of Mall Cafeteria. • *Bake Ovens.* Gas-fired ovens in hotels and restaurants. • *Barbecued Chickens De Luxe.* Gas equipment in kitchens of Maryland Chicken Inn, Beverly Hills, Calif.

WESTERN HOTEL REPORTER — *Guarantee Cooking Economy.* • *Unit Cooking Costs.*

SATISFACTION
multiplied by 3
When Mr. T. E. Roussell, proprietor of the ROUDELL COFFEE SHOP, SANTA CRUZ, CALIF., standardized on gas fuel, he solved three problems at once—cooking . . . water heating . . . space heating. He says:
"The cleanliness of gas and the convenience of automatic oven-control were deciding factors in the complete gas-conversion of Cafe Roudell.
"Gas speed and flexibility enable our Chef to get the exact heat he requires, insuring tasty meals and satisfied customers, as well as low operating costs.
"Our overhead air unit heaters help to keep the dining rooms clean and attractive, and do not take up valuable space. We highly recommend this modern fuel."
Thousands of restaurants and hotels, large and small, from Canada to Mexico, are gas-equipped. Ask their managers why, and you, too, will choose gas!
PACIFIC COAST GAS ASSOCIATION, INC.
(A non-profit service organization of which your Gas Company is a member)
447 SUTTER STREET, SAN FRANCISCO, CALIFORNIA
SHE
IS YOUR BEST REASON
SHE, your customer . . whose dread washday you have conjured into a smiling, doorstep delivery . . is your best reason for using GAS, the modern fuel
BTU's and boiler ratings mean nothing to her. But a fragrantly-clean "wash," prompts, accurate service, and reasonable prices mean everything! Gas fuel contributes to all these . . . because it is clean, quick, dependable, economical.
That is why thousands of modern laundries, large and small, prefer gas. Ask your gas company for the free technical service of an Industrial Engineer. His facts and figures may surprise you.
Gas-fired, of course!
Completely modern, automatic steam boiler installation of COMMUNITY LAUNDRY, Los Angeles. C. C. Craig, President says: "Gas is a decided asset to us. It is not only clean and economical, but also positive and dependable."
Quick Clean Economical Gas the modern industrial fuel
PACIFIC COAST GAS ASSOCIATION, I
(A non-profit service organization of which your Gas Company is a m
447 SUTTER STREET, SAN FRANCI

WESTERN MACHINERY & STEEL WORLD—*Natural Gas in Steam Boiler Plant.* • *Heat Treating Equipment in a College Laboratory.* Equipment for scientific research and production at Pasadena Junior College. • *Mechanical Handling of Citrus Fruits.* Gas-fired steam boiler plant at Sierra Madre-Lamanda Park Citrus Ass'n. • *Combustion Efficiency Tests.* Scientific means of determining boiler plant efficiency. • *Gas Unit Heaters in Office and Shop.* Neuner Printing & Lithograph Co., Los Angeles, and Ventura Junior Colege.

WESTERN CONFECTIONER—*Welch's Candy, Ltd.* Gas-fired equipment insures quality product. • *Pioneer Candy Firm Uses Gas-fired Furnaces.* Townsend California Glace Fruits Co.

WESTERN PLUMBING & HEATING JOURNAL—*The Truth About "Gas Savers."* Adapted from Gas News, of Southern Calif. Gas Co.

WESTERN FURNITURE RETAILING —*Electrolux Sales Up.* Increase in sales over 1933. • *P. G. & E. Aids Federal Housing Act.* Outlines promotion plans to dealers.

PACIFIC COAST CHEF — *Kroetch's.* Gas-fired cooking equipment in Seattle delicatessen. • *Kitchen Fuel Efficiency.* Burner Adjustments. • *Gas and Electricity as Cooking Fuels Compared.* Gas proves superior in tests at Ellenberg State Normal School, Washington. • *Firing Periods.* Correct firing of gas appliances for greatest efficiency.

KEELER'S PACIFIC HOTEL WEEKLY—*Cuisine and Catering Facilities, Clift Hotel.*

HOTEL NEWS OF THE WEST—*Gas Fuel in White Log Taverns* • *Clift Hotel.* Complete gas cooking and baking in main kitchen.

PACIFIC DAIRY REVIEW—*Unit Steam Production Costs.* Evaporation tests to determine unit cost of steam production. • *Automatic Control Equipment.* Description and discussion of all types for gas-fired steam boiler plants.

Typical examples from 1934 campaign of 56 advertisements, published in 20 leading Coastwide trade journals. It is this advertising that makes possible the placing of our technical news stories and feature articles.

With the ASSOCIATIONS

Indiana Gas Ass'n Elects 1934-1935 Officers and Directors

THE Indiana Gas Association in its convention on November 16 at Purdue University, Lafayette, Ind., elected the following officers to serve for 1935:

President: R. N. Zeek, Northern Indiana Public Service Co., Michigan City.

Vice-President: L. C. Heavner, Northern Indiana Public Service Co., Fort Wayne.

Secretary-Treasurer: P. A. McLeod, New Castle.

Directors: E. E. Linburg, Indiana Gas Utilities Co., Richmond; H. V. Armstrong, Indiana Gas Utilities Co., Terre Haute; H. C. Wolf, Central Indiana Gas Co., Muncie; G. L. Oglebay, Public Service Co., Hammond; D. H. Mitchell, Northern Indiana Public Service Co., Hammond; and W. M. Martin, Indianapolis.

Alexander Forward, managing director of the American Gas Association, and R. B. Leckie, Professor of Gas Engineering, Purdue University, addressed the Association. A paper by Hall M. Henry, Utility Management Corp., on "Gas Sales," was also presented.

Gas Subjects Listed Among A.S.M.E. Program Papers

The program of the 1934 annual meeting of the American Society of Mechanical Engineers, which is being held in New York City December 3-7, includes a paper on "The Use of Gas in Domestic Heating," by Professor R. B. Leckie, gas engineering department, Purdue University, Lafayette, Ind.; and "Calibration of Rounded-Approach Orifices," by J. F. Downie Smith, instructor in mechanical engineering, Harvard University, Cambridge, Mass. A. Wrisselberg, consulting engineer of Jersey City, N. J., is discussing "Status of the Heat Transfer Between Liquid and Gas Contact" at the meeting.

1935 Officers and Committees To be Chosen in January

January 17, 1935, has been selected for the next meeting of the Midwest Industrial Gas Sales Council. Palmer House, Chicago, Ill., will be headquarters for the Council. Election of officers and appointment of committees for 1935 will be a feature of the meeting. A resume of the 1934 A.G.A. convention, and a recitation of actual sales experiences of Council members also will be presented, according to Porter W. Hay, secretary-treasurer of the Council.

Oklahoma Utilities Association Sets 1935 Dates

The 17th annual convention of the Oklahoma Utilities Association will be held at the Biltmore Hotel in Oklahoma City, Okla., March 12-13, 1935. No exhibits will be included on the convention program, according to E. F. McKay, manager of the Association.

Registration Reaches 4,583 for 16th A. G. A. Convention

EXHIBITS held the spotlight of interest at the industry's annual convention, which concluded on November 1. This 16th A. G. A. event, at Atlantic City, revived the convention exhibition and brought together over 160 exhibitors who used 52,000 square feet of exhibit space to show the new in gas equipment and appliances. Convention registration reached 4,583.

As was to be expected, government activities were passed in review in a number of convention headline features. President H. O. Caster, Managing Director Forward, and other speakers censured the T. V. A. program, and the industry's general condemnation of this and similar federal enterprises took form in a significant convention resolution. The resolution instructed Association officers and directors to take proper action to bring before government officials and the public the facts of this situation, and to secure restriction of the Tennessee Valley Authority or similar public programs within fair and economic limits.

A symposium on electric competition on the Commercial Section program brought together testimony from numerous companies in the government competition belt as to methods being used there to hold the field for gas. These papers are commented upon elsewhere in this issue.

Another government activity on the convention program, and one more favorably greeted, was that of the Federal Housing Administration. Markets for new gas load were suggested in several papers which touched upon the F. H. A. Better Homes promotion, in which gas companies are joining throughout the country.

Natural Gas Department meetings again were an important feature of the convention. The Department's committee on time and place decided that a Spring meeting is to be held, and selected Memphis, Tenn., as the spot, dates being May 6 to 9.

New officers, directors and section and department chairmen for the A. G. A.'s 17th year were covered in September *Western Gas.*

Technical Committees Organizing for P. C. G. A. Year

PACIFIC Coast Gas Association's active committee organization is being rounded out for the 1935 program, a number of appointments having been made since those reported in last month's issue.

A. R. Bailey, chairman of the Technical Section, has appointed J. F. Sauer of the Pacific Gas and Electric Co., to the chairmanship of the Production Committee.

P. E. Beckman, chairman of the Natural Gas Transmission Committee, Technical Section, has appointed the following subcommittee chairmen:

Pipe Protection, A. B. Allyne—Southern Counties Gas Co., chairman.

Internal Corrosion and Dehydration—F. A. Hough, Southern Counties Gas Co., chairman.

Compressor Plants, Grove Lawrence—Southern California Gas Co., chairman.

Large Volume Measurement— R. M. Stewart, Pacific Gas and Electric Co., chairman.

N. L. Hoff, chairman of the Distribution Committee, Technical Section, has made the following appointments:

Safe Gas Distribution Practice—C. A. Renz, Los Angeles Gas and Electric Corp., chairman.

Effect of Humidity on Meter Proof—Guy Corfield, Los Angeles Gas and Electric Corp., chairman.

Procedure for Distribution Valve & Governor Inspection—E. G. Campbell, Pacific Gas and Electric Co., chairman.

H. W. Geyer, chairman of the Utilization Committee, Technical Section, has appointed R. C. Terradell, Los Angeles Gas and Electric Corp., chairman of the subcommittee on Field Equipment and Training of Service Men.

Wisconsin Operating Men Meet at Madison

WISCONSIN Utilities Association Technical and Operating Section, gas and electric divisions, met in joint sessions on November 22 and 23, in Madison, Wis. Convention headquarters were at the Loraine Hotel; registration totalled 226.

While technical matters came in for a large place on the program the subject of sales development was also given prominent attention in several papers.

Among the papers presented before the gas division were the following:

"Meeting Competition," by A. C. Davey, Wisconsin Public Service Co.

"Diversion and Unaccounted-for Gas," by Frank Burns, Milwaukee Gas Light Co. Discussion: F. W. Hainer, Wisconsin Power and Light Co., and S. B. Sherman, Wisconsin Gas and Electric Co.

"Gas Meter Shop Practice," by E. C. Hemes, Milwaukee Gas Light Co.

"Gas Utilization," H. J. Dropp, Milwaukee Gas Light Co.

Reports presented at the meeting included

that on "Combustion Researches Conducted Under the Gas Fellowship," by Professor O. L. Kowalke, University of Wisconsin; and "Gas Service Rules Committee and Uniform Standard Meter Report," by S. B. Sherman, Wisconsin Gas and Electric Co.

Alexander Forward, managing director of the American Gas Association, addressed the meeting.

L. P. Ziebell, Wisconsin Public Service Corp., Green Bay, was elected chairman of the Gas Division and T. J. Danehy, Wisconsin Fuel & Light Co., Manitowoc, vice-chairman.

T. N. Kellett, L. A. G. and E. Supt. of Gas Manufacture, Dies Nov. 9

THOMAS N. KELLETT, superintendent of gas manufacturing for the Los Angeles Gas and Electric Corp., died on November 9 from the effects of an operation.

Mr. Kellett was a fine example of the "self-made" man. His early experience took him through the stages of plumber's helper, tool room helper, tool dresser, and oil field foreman. He was in China, Russia, Rumania and South America for some years with Standard Oil interests.

T. N. Kellett

In 1902 he spent a short period with the Los Angeles gas company as night watchman. He was employed again in 1918 as master mechanic. In 1919 he left the company to superintend installation of a briquetting plant in South Dakota, but returned in 1921 as assistant superintendent of gas manufacture. He succeeded to the superintendency in 1925 and held the position until his death at the age of 54.

Mr. Kellett was of an inventive turn, holding several patents in the field of gas operation. He was a long time member of the Pacific Coast Gas Association and active in its Technical Section.

Laboratory to Test Appliance Thermostats; Also Pilots

The American Gas Association Testing Laboratory now has the facilities available to test gas appliance thermostats under the recently approved Listing Requirements for Water Heater, Gas Range and Space Heater Thermostats. The new requirements include minimum standards of construction and assembly covering such items as resistance to pressure, strength, dial marking, resistance to corrosion, adjustments, connections, etc. They also embody performance requirements for capacity, dial calibration, leakage, continued operation, overshoot, and other tests peculiar to individual types of these devices. Thermostats which meet all of the applicable requirements are entitled to bear the Laboratory Listing Symbol which is a guarantee that the device on which it appears will give satisfactory service on appliances when properly installed.

The Laboratory also has extended its activities to include a certification schedule for thermostatic pilots, as a result of the recently adopted Listing Requirements for Automatic Devices Designed to Prevent Escape of Unburned Gas. The standards include constructional requirements covering such subjects as adjustments, strength, assembly, marking, and resistance to corrosion. Performance tests are made to determine time of operation to open and close, pilot operating characteristics, ability to endure continued operation, capacity and leakage.

Whatcom Natural Gas Co. Begins Actual Service

Whatcom Natural Gas Co., Bellingham, Wash., began service of natural gas to the Whatcom County Home in November. The company will also serve approximately 60 residences in the North Bellingham district in the near future.

A one-half mile extension of the new system, to start at once, will bring service to the master breeding farm of the Washington Cooperative Chick Association near Four Corners, Wash., according to C. S. Shippey, president of the company. The new auxiliary line will furnish fuel for two large brooder plants of the Association, and other buildings on the farm.

University Bulletin on Water Tube Gas Condensers

The engineering experiment station of the University of Washington, Seattle, Wash., has issued Bulletin No. 75, entitled "Water Tube Gas Condenser." Author of the bulletin is Prof. Sydren Ruurd Tymstra, assistant professor of general engineering. The bulletin deals with results obtained from tests performed on water tube gas condensers and suggests design factors, being offered as a contribution to information on heat transfer in such apparatus.

C. A. Renz and H. S. Harris in New Duties for L. A. G. and E.

Several changes in the Los Angeles Gas and Electric Corp. distribution staff are announced by W. M. Henderson, superintendent of gas distribution. C. A. Renz has been made assistant superintendent of distribution. Henry Harris, formerly assistant engineer, is now engineer, and in addition to other duties has direction of the meter shop. The meter shop was formerly in charge of S. E. Bangerter, who recently retired from service.

P.C.G.A. Proceedings Soon Ready

The 1934 Proceedings of the Pacific Coast Gas Association are now in the hands of the printer and should be mailed to all members before the first of the year. The book will take the same form as the 1933 Proceedings, 9- by 12-inch in size, and will be bound in a heavy board cover.

Clifford Paige Representing U. S.

Clifford H. Paige, vice-president of the Brooklyn (N. Y.) Union Gas Co., was elected vice-president of the International Gas Union for a term of three years, representing the U. S., at the recent Zurich, Switzerland meeting of the Union.

Byllesby Executive Retires After 39 Years of Service

Robert G. Hunt, vice-president of Byllesby Engineering and Management Corp. and Standard Gas and Electric Co., after 39 years of service with the Byllesby organization and predecessor companies, resigned on December 1 to retire to private life. Mr. Hunt plans to reside at Griffin, Georgia, 40 miles south of Atlanta.

Following some eight years' experience in railroad work, Mr. Hunt in 1895 was appointed general manager of the Fort Smith Light and Traction Co. at Fort Smith, Ark. He served in this capacity for 10 years. In 1905 he was appointed manager of San Diego Consolidated Gas and Electric Co. — that company's first manager following its acquisition by H. M. Byllesby and Co. In 1906 he was transferred to Chicago and appointed assistant to Arthur S. Huey, vice-president in charge of operation, H. M. Byllesby and Co. In 1923 he was elected vice-president of the company in charge of property acquisitions.

John H. Hartog Managing Seattle Briquet Concern

John H. Hartog, for the past 15 years with the Portland (Ore.) Gas & Coke Co., has been appointed manager of the Petroleum Briquet Co., of Seattle, Wash. Mr. Hartog served as manager of the advertising, appliance and briquet sales departments at Portland until the company discontinued merchandising. He has been an active member of the Pacific Coast Gas Association for many years.

30th Annual Convention Dates Set For Mid-West Gas Association

The 30th Annual convention of the Mid-West Gas Association will be held April 15-17, 1935, at Omaha, Neb., with convention headquarters at Hotel Fontenelle, according to R. B. Searing, secretary-treasurer of the Association.

F. H. Brooks, vice-president of the Northern Natural Gas Co., Omaha, has been appointed chairman of the committee in charge of the convention program.

Ragsdale in Charge at Banning

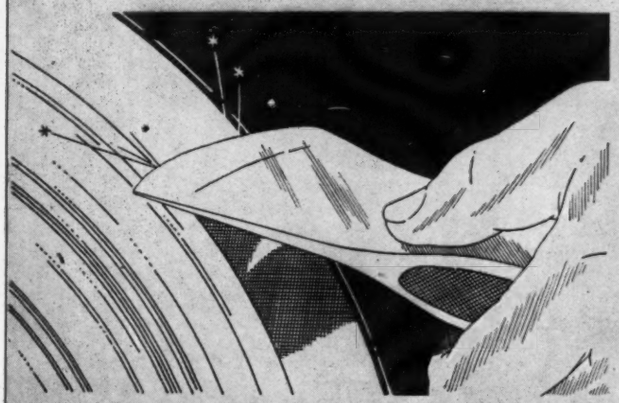
J. M. Ragsdale, formerly sales supervisor of the northern division of the Southern California Gas Co., has been made district agent for the company at Banning, Calif. In addition to Banning he will have supervision of the company's activities in Beaumont, Palm Springs, San Jacinto and Hemet.

Okla. City Gas Franchise Expires

The Oklahoma Natural Gas Co.'s franchise in Oklahoma City expired October 29. No application for a new franchise is pending, but the proposed $4,000,000 bond issue for a municipal gas system is scheduled to be voted upon in Oklahoma City January 16, 1935.

Cisco Gas Corp. Now Operating

Cisco (Texas) Gas Corp. began service of natural gas in October through its recently completed distribution system. The company headquarters are located in the 700 block on D Avenue.



ASK YOUR HEATING CONTRACTOR

HE HAS NO AX TO GRIND

If you want expert advice on choosi- the right fuel, take our advice liable heating contractor. want you to use Gas, an reasons why you sh for us, nearly all the l tractors feel the same would rather have you h one of them.

It is obvious that your he has no axe to grind. Very l find that he sells ALL types o You will sense, at once, that h engineer than a salesman. You practical, thorough and unbiase studies your problem. But impartia is, we still expect him to recommend Natural Gas. Why are we so sure?

Because we know that he is, first of all, a human being. Like the rest of us, he makes comparisons, forms opinions. He can't es- e fact that Gas outperforms heavy- cause he sees it happen almost . In his regular work of installing, epairing and replacing heating exceptional fuel is bound to

we refer you so confidently nt heating contractor for ave to look at the records is thinking and saying.

J BAY REGION APART- ; HAVE ALREADY ER TO NATURAL GAS

A.H.J.—206-634

MEMO

Date: Dec. 1, 1934.

To: The Gas Heat Trade:

Thought you might be interested in what we're telling the apartment and hotel people.

Thirty ads in this 1934 series... all put the heating contractor first.

Results were excellent. We intend to do similar promotion in 1935.

Noticed that "Business Week" says "More F. H. A. money being spent on heating than anything else... survey shows 17.71 per cent."

Congratulations! Keep up the good work.

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

Owned · Operated · Managed by Californians

Reprint from P. G. & E. advertisement in June issue of
Oakland Apartment House Journal . . . East Bay Apartment House Journal. . . San Francisco Apartment House Journal . . . San Francisco Guardian
Total circulation 6000

Some of North Shore Gas Co.'s Advertising on Spring and Fall Heating.

"Part Time" Heating Is New Sales Theme

By RODGER K. TENNEY

North Shore Gas Company, Chicago, Illinois

IN many localities served by manufactured gas companies there has been a definite reversal of popular conception of gas heating as a luxury. While it is true that gas heating in most communities does cost a few dollars more than solid fuel, the actual fuel cost is not the sole question with those who do install gas heating. They want gas heating because they recognize its great superiority as a fuel.

With fall and spring heating, however, it has been found that operation of the gas burner used for this type of service costs no more, or in some homes perhaps slightly more, than solid fuel for the periods during which it is used. With solid fuel there is much waste in the fall and spring. Gas heating eliminates this waste and at the same time creates convenience and prevents overheating.

It seemed logical to officials of the North Shore Gas Co. that many of its customers might approve of a heating service which would allow them to use their solid fuel during the extremely cold months, allowing gas heating, with all of its convenience and controlability, to supply heat during the fall and spring when only an occasional furnace fire is needed to maintain a comfortable temperature.

As a load building medium and an avenue of new business, this idea of extending customers gas heating service on a "part time" basis offered a strong appeal.

The North Shore Gas Co. supplies 550 B.t.u. manufactured gas to about 24,500 customers in a large area, including Winnetka, Highland Park, Lake Forest, Waukegan and Libertyville, Illinois, as well as many other smaller towns contiguous to those mentioned.

The company's heating rate included only the operation of central gas heating equipment for the complete heating season. Therefore, it was necessary, in addition to securing practical "partial" heating season equipment, to devise an attractive rate to secure this business. In order to build fall and spring heating load, the rate for this service was placed at 65 cents per M c.f., a rate slightly higher than the regular gas heating rate.

A burner which takes the place of the firing door on the furnace or boiler, hanging on the same hinges, was selected in the "Firedor" gas burner, manufactured by the Surface Combustion Co. This equipment could be installed and removed readily, without interfering in any way with the customer's use of solid fuel.

With this burner it is possible to have gas heat during September, October, November and possibly the first few days of December. Again, in the spring, when really cold weather is past, the burner is installed and gas heating begins.

A sales campaign to introduce this new type of heating service to its customers was begun by the North Shore Gas Co. several weeks ago. An intensive program was laid out so that as many installations as possible would be made before too cold weather arrived.

Five special salesmen were recruited from the sales department. Several training sessions served to acquaint salesmen with the new burner. These men together with four regular house heating salesmen comprised the sales crew.

As a regular part of its records the North Shore Gas Co. house heating department has complete information on the type of fuel used in each home in the company's territory. These data are proving of invaluable worth in this "Firedor" campaign. Each salesman knows the address of each coke and coal user and thus saves much time and covers more ground. Salesmen have restricted territories and must canvass them exclusively.

At the same time that salesmen were put into the field selling the "Firedor" a bill enclosure was mailed to the entire residential meter list of the company. This folder, entitled *"Now,* freedom from fall and spring furnace tending," described briefly the advantages of installing the new burner and told about the special "trial offer" for its installation. On this "trial" plan the company installs the burner on a 24-month payment plan of $2 monthly during this period. No charge is made for installation and if at any time the customer wishes the burner removed it is taken out without cost.

Regular newspaper advertising was scheduled which also is helping to open the way to more installations.

From the first day of the campaign it was apparent that there was a real interest among customers for a heating service of this type. The bill folder brought many inquiries, and other advertising is creating and maintaining additional interest.

Besides their commissions for sales, which are approximately 10 per cent of the cash selling price of the burner, the salesmen will share a prize pool to be distributed at the close of the campaign. One dollar is being contributed to the pool by the company for each sale made. The five prizes in the pool will bring the winning salesman 40 per cent of the total. Second place will draw 30 per cent, third 15 per cent, fourth 10 per cent, and fifth 5 per cent.

While the campaign is still in progress and it is too early to relate final results, the number of installations to date assures the success of the program.

Southwestern Meter School Committee Reorganized

THE annual reorganization meeting of the General Committee for the Southwestern Gas Measurement Short Course was held in the Oklahoma Utilities Association offices in Oklahoma City, November 19, with D. C. Williams of Ponca City, general chairman, in charge.

New members of the committee for the 1935 short course are B. P. Stockwell of the Corporation Commission; William F. Lowe of Tulsa, secretary of the Natural Gasoline Association of America; J. H. Satterwhite, Tulsa, American Meter Co.; Earl Kightlinger, Shreveport, La., Arkansas Natural Gas Corp.

John H. Baxter of the Inland Gas Co., Ashland, Kentucky, who was identified actively with the short course during the first two years of its history, was added to the ex-officio membership comprised of past general chairmen.

Chairmen of sub-committees are the following: Banquet, Entertainment and Arrangements, W. H. Carson, Norman; Program, R. D. Turner, Tulsa; Exhibits, G. W. McCollough, Bartlesville; Registration, E. F. McKay, Oklahoma City; Study of Practical Methods, Ray Roundtree, Houston, Texas; and Publications, Max Watson, Amarillo, Texas. The General Committee will hold a meeting in January to decide dates for the 1935 course, to be held, as usual, at Norman.

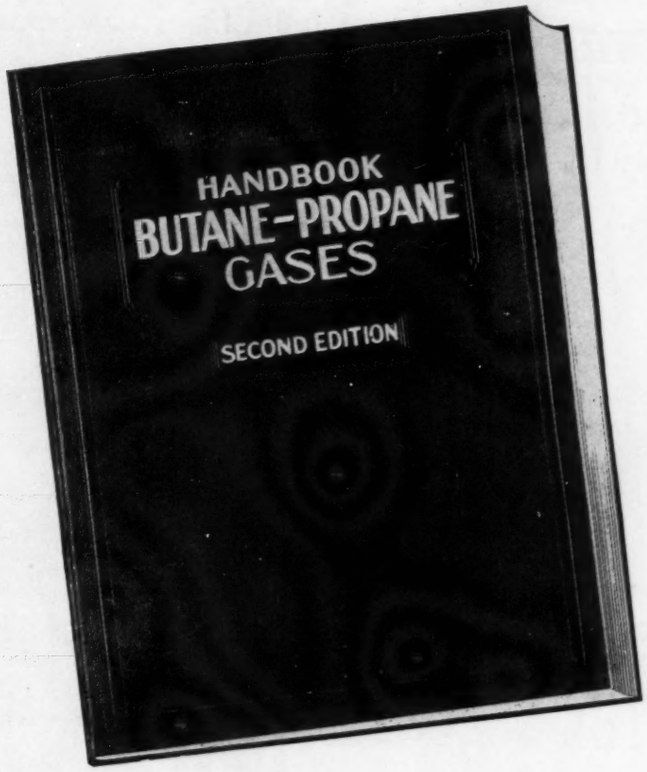
Natural Gas For New S. F. Brewery Maintains 100 Per Cent Record

Natural gas-fired boiler installations are used for steam generation in 100 per cent of the liquor plants and breweries in the San Francisco Bay territory of the Pacific Gas and Electric Co. The most recent rectifying and distilling plant to be opened in this area is that of Hiram Walker & Sons, Inc. Operations include the distillation of gin, blending and bottling of whiskey blends, and bottling of straight whiskey. Equipment of the plant, which was placed in operation November 1, is entirely modern in every respect, and automatic in every possible detail. A 100 H.P. natural gas fired Scotch Marine boiler, provided with automatic damper and fuel control, supplies the steam requirements of the new plant.

Without Obligation!

. . . you can examine this book FREE [See the Coupon]

● *Look at this Table of Contents:*



- MORE Illustrations
- MORE Graphs
- MORE Articles
- MORE Tables
- MORE Pages

—in this Big, New **SECOND EDITION**

SUMMARY OF DEVELOPMENTS: Brief review of progress during past two years since publication of first edition, including foreign expansion, new industrial uses, new manufacturing sources, new plant and equipment design, etc.

USE IN INTERNAL COMBUSTION ENGINES: A comprehensive discussion of liquefied petroleum gases in this important new use including engine design, comparison of propane and butane with other fuels, use in stationary engines, block testing automotive engines; use in rail cars, trains and locomotives; use in automotive engines; refrigerator cars and trucks; dirigibles and aeroplanes; utilization equipment such as carburetors and mixers, vaporizers, fuel tanks, valves and fittings, etc.; consideration of safety in relation to internal combustion engine use of these gases.

DESIGN AND INSTALLATION OF STORAGE: A basic chapter analyzing the several codes now applying to liquefied gas storage, including the National Fire Protection Association Rules, A. P. I. Pressure Vessel Code, California Liquefied Petroleum Gases Safety Orders, proposed California pressure vessel safety orders, etc. Fundamental discussion of good design practice touching such phases as determination of working pressure, design of shell, design of heads, reinforcement of openings, fabrication of vessel; shop inspection and hydrostatic tests; emergency relief provisions. Separate discussion of installation for permanently installed vessels (above ground); underground storage; skid tanks; fuel tanks for tractors and trucks. Also sections on piping for butane tanks, gauging methods, protection of gauging and emergency relief devices.

SUPPLY FROM PETROLEUM REFINERIES: Characteristics of refinery gases with reference to liquefied gas production. Detailed discussion of oil absorption and compression processes for liquefied gas recovery; fractionating columns; extraction of ethane from refinery vapor.

ENGINEERING DATA ON THE LOWER OLEFINS: A basic reference chapter consisting of tables on properties of liquefied petroleum gases produced from petroleum refineries; a companion chapter to that in the original Handbook on properties of the natural-gas-produced liquefied petroleum gases.

DOMESTIC APPLIANCE TESTING AND UTILIZATION: Separate discussions of undiluted and carbureted gases from the standpoint of their burning characteristics. Appliance testing procedure on liquefied petroleum gases, with special reference to American Gas Association methods. Fundamentals of appliance design for proper use of these gases. Latest A. G. A. Laboratory Approval requirements. Standards of construction and performance for gas appliance accessories.

COMPETITIVE POSITION OF THE LIQUEFIED GASES: Economic comparisons, illustrated by ready-reference charts, comparing liquefied gas costs with cost of electricity, kerosene, oil, manufactured and natural gas, coal, etc.

TOWN PLANTS: A new chapter combining discussion of butane-air and undiluted types of plants. Written from a practical operating standpoint and giving latest information on new plant equipment as well as present trends in over-all plant design. A section is included on fundamentals of distribution design, plant operating problems, etc.

MANUFACTURE FROM NATURAL GAS: A new chapter dealing with the natural gasoline plant process, with special reference to operations involved in liquefied gas recovery. Flow diagrams assist in presentation of plant processes.

SPECIAL USES: Orchard heating, construction camp use, and various special applications such as cutting and welding.

SUPPLEMENTS AND REVISIONS

A number of chapters in the first edition have been retained for the second edition, with additions and modifications made by their original authors to bring them in line with present knowledge. Late information will be found in the Handbook on:

TRANSPORTATION: New material on motor truck and trailer design, describing typical equipment in use, pumps for loading and unloading, etc.; current railway freight rates; requirements for shipping by water, etc.

USE WITH OTHER GASES: An added section on standby gas, also further discussion of reforming, use of propane for underfiring coke ovens, and use of butane or propane with coal gas under peak load conditions.

ANALYSIS AND TESTING: Specifications for commercial grades, test procedure for determination of specific gravity, water content, vapor pressure, etc. The above and other additions have been made to the chapter on Composition and Analytical Determination.

PROPERTIES OF MIXTURES: Additional curves have been drawn including those on dew points of butane, propane, and typical mixtures, carbureted with air; curves showing relation between B.t.u. and specific gravity.

BOTTLED GAS DISTRIBUTION: This chapter has been brought up to date, with sections on foreign sale of bottled gas, present trends in bottled gas merchandising, new types of service equipment being developed.

BIBLIOGRAPHY: This valuable feature of the first edition has been extended to list worthwhile material published during the past two years.

CENTRAL PLANT DIRECTORY: A new town plant directory numbering all operating plants as well as several to be constructed in the future; will give information secured directly from the companies on plant location, number of meters, type of service, plant capacity, rates, etc.

CATALOGUE SECTION: Current detailed engineering information on the many products now manufactured for special service on butane and propane.

BUYERS' GUIDE: Revised commodity listing of firms supplying equipment, appliances, or services for the liquefied petroleum gas industry.

Here's a Handy "ON-APPROVAL" Coupon

WESTERN GAS,
810 South Spring St., Los Angeles, Calif.

Send me the Handbook of Butane-Propane Gases **(Second Edition)**, just as soon as it is off the press, for 10 days' examination subject to approval or return. Within 10 days of receipt I will send $5.00, plus a few cents for postage and delivery, or return the book postpaid. (We pay postage on orders accompanied by remittance.)

Name.....Position.....

Company.....

Address.....City and State.....

Check for $.....enclosed. Date.....

(Books sent on approval in U. S. and Canada only.)

FRASER
Radiant Front Console
Equipped with Fan

Velgrain Finish

The heater that smiles while it warms

Manufactured by
Fraser Furnace Company
Stockton, California
Distributed by
H. R. Basford Company
San Francisco Los Angeles

The Chill Chaser Cooperative Space Heater Campaign

(Continued from Page 10)

(a) If there were danger of setting a precedent which might carry over into normal operations, the majority of companies would prefer not to pay a bonus to dealers on sales. However, this campaign was so special and any offer can be so definitely restricted to this campaign, that this possibility could be heavily discounted.

(b) All companies wanted the maximum possible aggregate volume of sales by all outlets in their territories. A bonus to dealers would, beyond question, be the best single stimulus to active participation on their part to capitalize most fully on the company's unusual publicity efforts.

(c) An inducement to dealers would result in increasing their sales and would thus go far to secure active cooperation and support of all heater manufacturers and their distributors, who might otherwise feel that the campaign must divert some of their business to the Peerless leader model heater. Their cooperation was recognized to be of vital importance.

(d) Since company employees and sales people were to receive a bonus on heater sales closed by them for dealers, any direct bonus to dealers should not apply to such sales, completely consummated by company employees.

(e) The bonus to be paid should be 50 cents for each and every heater (of all makes approved by the company) sold by the dealer during the campaign, except sales *closed* for dealers by company employees, provided the dealer would agree to either (1) Match all or part of this amount in space heater advertising over his own name during the campaign, or (2) Pay this amount less any amount used in advertising under (1) above, as *extra* compensation during the campaign to his own sales people; each company to work out a plan with the dealer in its own territory embracing either option (1) or option (2) just above, or any acceptable combination of the two.

Publicity; Advertising

The Committee on Publicity and Advertising submitted a report embodying a title and slogan for the campaign. Realizing that for many years the gas industry, in launching house heating drives, had centered them around such themes as "Fire your furnace from an easy chair" and a more or less cold presentation of heating equipment, this committee sought an underlying idea for the campaign advertising which would carry freshness of thought, human interest appeal, quick public acceptance, ready dealer cooperation, employee appeal and adaptability for use by each company. Following this thought, the title adopted was "Chill Chaser Campaign" and the campaign slogan was "You need a little Chill Chaser in your home this winter." It was brought out that the slogan applied directly to the space heater as a "Chill Chaser," the Junior Salesman as a "Chill Chaser" and natural gas for heat as a "Chill Chaser."

To dramatize and publicize the Chill Chaser Program, the committee suggested that numerous media be used, that the copy include the "Chill Chaser" slogan; that as far as possible the red and yellow scheme be carried out; and that a caricatured stork-like bird bringing to the customer's home a gas space heater wrapped as an infant would add a great deal of human interest to the campaign. The following advertising means were selected: Bill boards, window trims, folders for distribution by Junior Salesmen, bill enclosures, street car cards, radio, a set of 12 newspaper advertisements preceded by four teasers, direct banners, tire covers and motion picture advertising. A complete 12-page dealer prospectus was to be printed as well as a pamphlet "Facts about Natural Gas" for dealer and company sales people. Employee set-up was to be prepared by each individual company.

The Committee on Connection of New Customers submitted a very thorough report on the possibility of increasing the number of gas customers served during the Chill Chaser Campaign period.

To stimulate further interest, the executives of the six companies purchased an Executive's Trophy to be awarded to the executive of the company making the best record during the activity, the result being based upon the number of Chill Chaser Heaters sold and the number of new customers secured. Another trophy was to be awarded to the sales manager of the winning company

METAL-BESTOS GAS VENT *and* FLUE PIPE

The Superiority of this Aluminum Lined Pipe over all other types of commonly used Gas Vent Pipe has won for it

NATIONAL ACCEPTANCE

■ Trial Installations will prove its Higher Efficiency, Safety, and Lower Installed Cost.

■ Tests Against Deterioration by Heat and Acids Prove an Indefinite Life.

Write for Descriptive Catalogue and Price List

MANUFACTURED BY
PAYNE FURNACE & SUPPLY Co.
BEVERLY HILLS CALIFORNIA

ROBERTSHAW "Automati Cook"

You Can't Expect Robertshaw Results Unless the Robertshaw Name is on the Dial.

ROBERTSHAW THERMOSTAT CO.
Youngwood, Pa.

DIRECTORY

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of Standard Gas and Electric Company

231 South La Salle Street, Chicago
New York Pittsburgh San Francisco

• HYDRAUGER •
MODERN HORIZONTAL BORING MACHINE
For Underground Installation of Pipe and Conduits. Avoids damage to costly Pavements and saves time. Send for Bulletin.
HYDRAUGER CORPORATION, Ltd.
343 Sansome Street • San Francisco, California

"BLUE BOOK"
Personnel Directory of the Gas Industry
1934 EDITION

This directory gives the personnel of gas utility district offices as well as headquarter companies, arranged by states and including distributing companies, pipe line companies, producing companies and holding companies. Each distributing company lists the kind of gas served — pressure—B.t.u. content—number of meters—and indicates whether or not each company merchandises.

Correct as of January 1, 1934, it is the most complete and up-to-date directory available—includes the entire United States.

176 pages
Published in convenient Pocket Size! 5 x 7 in.
1-10 copies $2.50 ea. 10-20 copies $2.00 ea.
20 or more $1.50 ea.

MAIL COUPON TODAY!

WESTERN GAS, "Publishers",
810 South Spring Street,
Los Angeles, California.

Date.....

Please send me.....copies of the "Blue Book" Personnel Directory, 1934 Edition, of the Gas Industry at $.....per copy, for which I enclose remittance of $.....

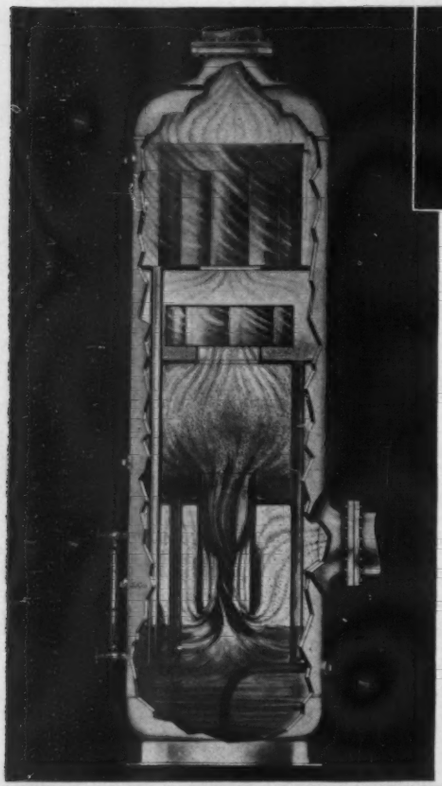
Company name.....

Address.....

"MODERNIZE as you repair"

THE SPRAGUE METER COMPANY
BRIDGEPORT, CONN.
Los Angeles, Calif. San Francisco, Calif.
Davenport, Iowa.
Newark, Ohio. Houston, Texas.

BLAW-KNOX



GAS CLEANERS

Deliver clean gas.

Remove all dust and liquid entrainment.

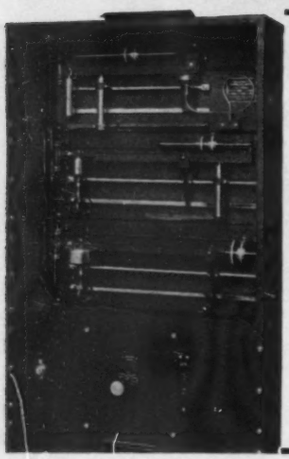
Operate without attention or shutdowns over long periods. Are capable of continuous operation.

Offer negligible resistance to gas flow.

Collected material is taken from path of gas flow and is quickly removable without shutting off gas flow.

Liquid contactor type.

BLAW-KNOX COMPANY
2033 Farmers Bank Bldg., Pittsburgh, Pa.



NOT a *position* control

The DFC Automatic Combustion Control actually maintains a definite, IDEAL RELATION between the quantity of fuel and air entering furnace. It DOES NOT adjust valves and dampers to a fixed setting for a given steam pressure without regard to the quantities flowing.

Full Information, BULLETIN 320-W

THE DENVER FIRE CLAY COMPANY
DENVER DFC COLO. U.S.A.
BRANCHES AT SALT LAKE CITY. EL PASO. AND NEW YORK

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

NRA WE DO OUR PART

and to the sales manager of the second highest company.

Following out the plan detailed above, the campaign began September 17 and continued through November 17. The public acceptance of the slogan "You Need a Little Chill Chaser in Your Home this Winter" has been very gratifying to each of the six companies participating. Dealers, salesmen and employees throughout each of the six properties found that wherever they went, the prospective customer already knew about the Little Chill Chasers, and the red and yellow trucks manned by crews of Junior Salesmen always created a sensation in the residential sections visited.

The results in actual sales during the first month of the activity showed that practically each company was nearing the 100 per cent quota mark at the half-way period and reports at that date already indicated that this, the first drive of its kind launched by six operating companies, would go down in history as a successful mass selling drive of merchandise and service.

Campaign totals have not been fully assembled at the time this report is written. However, as of November 10 the six participating companies had surpassed their total quota of 16,585 heaters, having sold 22,179 or 133.72 per cent of quota. Mississippi Power and Light Co. estimates that its quota has been passed by at least 200 per cent, and it is anticipated that the average total sales accomplishment for all companies will show above 175 per cent when all reports are tabulated.

New Compressor Plant and Gathering Lines at Kettleman Hills

A rearrangement of the gathering system in the Kettleman Hills field, which supplies gas for a large share of California requirements is under way with the construction of a 16-inch welded steel field gathering line being laid by the Kettleman Hills North Dome Association. The purpose is to centralize the wet gas system at one point for more efficient distribution of gas to the gasoline plants.

A new compressor station, consisting of six units, is being erected by the Kettleman Hills North Dome Association to pick up low pressure wet gas from the field and pump it into the gasoline extraction plant for distribution to the transmission line of the Pacific Gas and Electric Co. This line, to be completed this month, will increase the Association's handling capacity to 22,000,000 cu. ft. of natural gas daily, and will be capable of handling 12,000,000 cu. ft. daily in itself.

New Compressor Units to Boost Northern Natural Gas

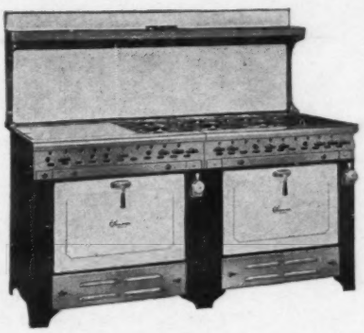
Northern Natural Gas Co. is constructing a 1600 h.p. compressor station at Ogden, Iowa, as part of its program for boosting gas northward through its main line now being completed into Minneapolis, Minn. Two 800 h.p. units are going into the station.

Northern Natural is also adding a 1250 h.p. unit at Palmyra, Neb. at a point where the Sioux Falls branch takes off the main line. Two other 1250 h.p. units have already been operating in this station. The work at both stations will be completed in December.

Restaurants GAIN BIG SAVINGS

with these modern, insulated ranges

ACCLAIMED as Fully 5 years ahead in Designs, Economy and Convenience.
UNEXCELLED for QUALITY any place in America!



Wedgewood's known reputation for building the finest gas ranges is well emphasized by this splendid line of Heavy Duty Restaurant Ranges. They are designed especially for Pacific Coast requirements. Worthwhile savings in labor and gas are gained because of the exact heat regulated, heavily insulated ovens. Rock wool insulation 3½ inches thick keeps the heat in the oven and out of the kitchen.

Many single and double oven styles from which to choose. On display at:
NATURAL GAS BUREAU
810 S. Flower St., Los Angeles
PACIFIC GAS & ELECTRIC COMPANY
San Francisco

JAMES GRAHAM MANUFACTURING CO.
San Francisco, Newark, Los Angeles, California
Portland, Oregon

Send for this **NEW BULLETIN**

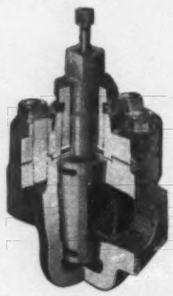
A newly printed Bulletin showing the many beautiful Wedgewood Restaurant Range Models now available. Send for your copy today!

WEDGEWOOD

Reliance Regulator
Corporation
Wishes
You A Merry Christmas
and a
Very Prosperous New Year

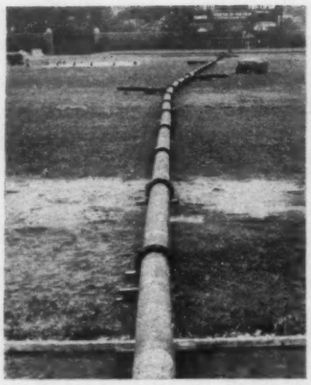
RELIANCE
REGULATORS

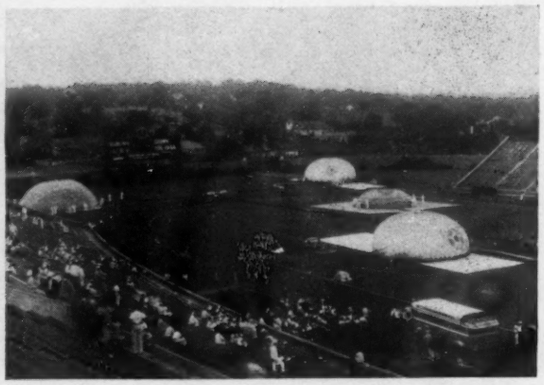
NORDSTROM
Lubricated
PLUG
VALVES



Cut-away view of Nordstrom Lubricated Plug Valve. Made in sizes from ½" to 30", in various metals. Also made with face-to-face dimensions same as gate valves, 2" to 12" permitting installation without altering pipe dimensions.

MERCO NORDSTROM VALVE CO.
A Subsidiary of
PITTSBURGH EQUITABLE METER CO.
Main Offices: Pittsburgh, Penna.
Branch Offices, Warehouses in Principal Cities





LEFT: Looking down the 10-inch Mono-Cast Doublex-Simplex pipe line from which the balloons were inflated simultaneously. Note the staggered "services." RIGHT: General view of Legion Field Stadium, Birmingham, showing inflation process under way.

Birmingham Domestic Gas Inflates Balloons

DOMESTIC gas from the mains of the Birmingham Gas Co. was used to inflate the five balloons which competed in the National Balloon Races recently held in Birmingham. The races, won by the Navy's entry, were held as an elimination contest to pick America's entry for the Gordon Bennett Cup race and were sponsored by Birmingham as a civic enterprise.

The problem of conveying gas to the balloons was solved by tapping the Birmingham Gas Co. main at the stadium entrance and running a 10-inch Mono-Cast Doublex cast iron pipe line on top of the ground down the length of the field as shown in the accompanying photographs. Gas was fed to the balloons through staggered "services" to which were attached gas-tight cloth tubes.

Gas was donated by the Birmingham Gas Co. and the pipe line by the American Cast Iron Pipe Co.

HIGH QUALITY—LOW PRICE

AGP
AUTOMATIC
STORAGE GAS
WATER HEATERS

Three models of quality water heaters at a price range to meet any campaign requirement. Each combines the highest efficiency with improved principles of design and sturdy construction. Perfectly controlled, highly efficient, yet lowest in price for comparable quality.

A. G. P. made in galvanized or Everdur tanks—20-25-30-40-75 gallon sizes.

A. G. P. SPECIAL made in galvanized tanks—20-25-30-40-75 gallon sizes.

THE DICTATOR Low-Priced Water Heater is made in galvanized or Everdur tanks—15-20-30-40 gallon sizes.

Write for Literature.

AMERICAN GAS PRODUCTS CORPORATION
40 West 40th St., New York, N. Y.
Division of
AMERICAN RADIATOR COMPANY

Pipe Line Enamel and Coating Machine Announced

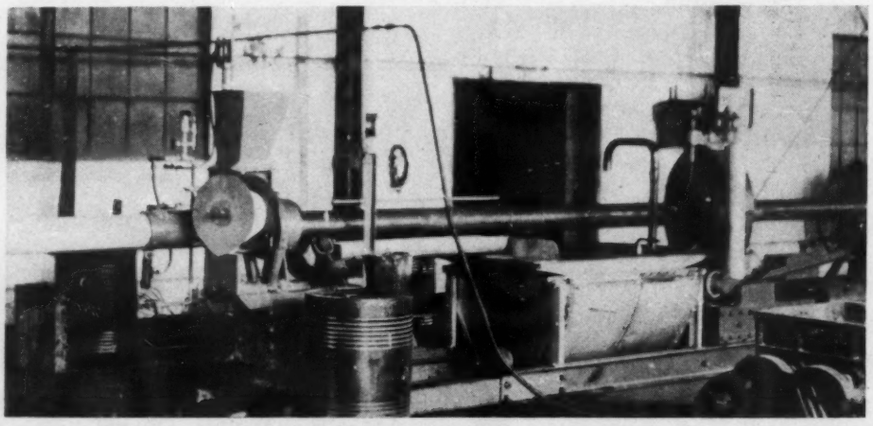
WAILES Dove-Hermiston Corp., New York City, has produced two new developments for protection of oil and gas pipe against soil corrosion.

A new grade of the company's Bitumastic Enamel, known as bitumastic 70-B enamel, has been introduced. This is all coal tar base enamel developed to prevent sagging or cracking from extremes of temperature after the coated pipe leaves the shop or storage yard.

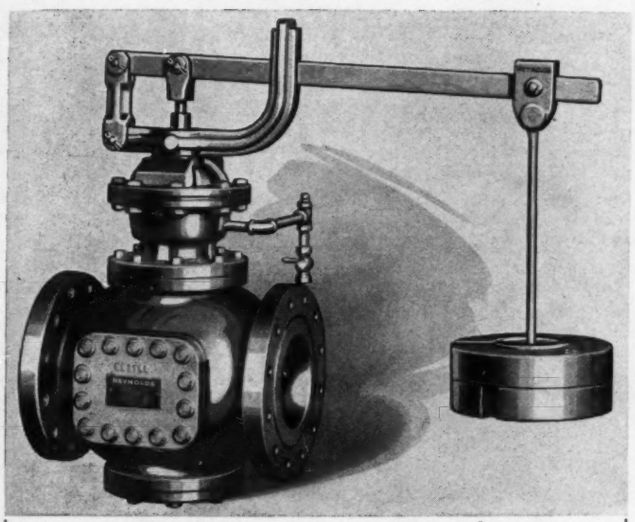
The company also announces a new pipe coating machine (illustrated below) developed principally to apply a hot bituminous coating to pipe, followed as part of the same operation by an overlying shield of ¼-inch cement mortar. Felt wrappings, either single or double, and bonded or unbonded, can also be applied over the enamel coating instead of the cement mortar by the new machine, according to the manufacturers.

A new feed device conveys the primed joints of pipe through the machine. These joints are temporarily fastened together by couplings so that an endless string of pipe is being coated and wrapped, the pipe revolving as it passes through the machine.

The pipe first passes over a tank of hot enamel. This hot enamel is pumped to a discharge nozzle above the pipe. It then



New pipe coating machine introduced by Wailes Dove-Hermiston Corp.



NEW High Pressure Control That Gives Wide Delivery Range

● REYNOLDS New High Pressure Line Regulator, without auxiliary bowl, features a wider range of delivery pressure control (2 lbs. to 100 lbs.), by use of four interchangeable diaphragm cases. It is manufactured in 2″ to 16″ sizes with cast iron, cast steel or bronze body, and a swivel head that simplifies installation in different shaped spaces. The valves in this unit can be replaced while the regulator is in the pipe line. Also, this regulator is available in pilot operated or pilot loaded construction with a choice of composition or metal seats.

In addition, Reynolds build High Pressure Line Regulators with auxiliary bowl where complete lock-up is required. Write for details.

REYNOLDS BRANCH OFFICES:
421 Dwight Bldg., Kansas City, Mo.
2nd Unit, Santa Fe Bldg., Dallas, Tex.
REPRESENTATIVES:
Eastern Appliance Co., Boston, Mass.
F. E. Newberry, Avon, N. J.
G. H. Unekefer, 428 Boyd St., Los Angeles

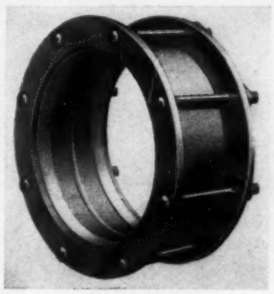
READY: Your copy of the Reynolds New Low Pressure and Appliance Regulator Catalog, (Catalog L, Section 3). Write for it!

REYNOLDS GAS REGULATOR CO.

Anderson, Indiana, U.S.A.

GAS CONTROL SINCE 1892

DAYTON PIPE COUPLINGS, CLAMPS and SLEEVES

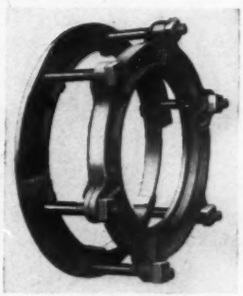


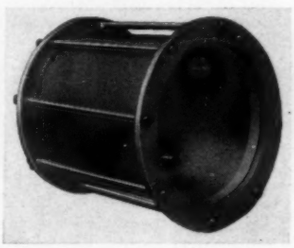
No. 1 ALL-STEEL COUPLING

To the inherent flexibility of a coupled joint, Dayton Couplings add the strength of all-steel construction. As long as the Dayton coupled line is in use all connections remain strong and flexible, permanently tight and absolutely leak-proof. Made in all standard sizes.

No. 12-B BELL JOINT CLAMP

A new design which provides a most economical method of permanently repairing leaks in lines of bell and spigot pipe. Construction of clamp and gasket assures an efficient and positive seal that is not only flexible but absolutely leak-proof under all conditions. Made in all standard sizes.



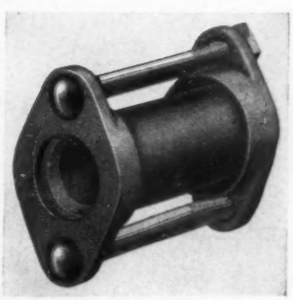


No. 5 ALL-STEEL SLEEVE

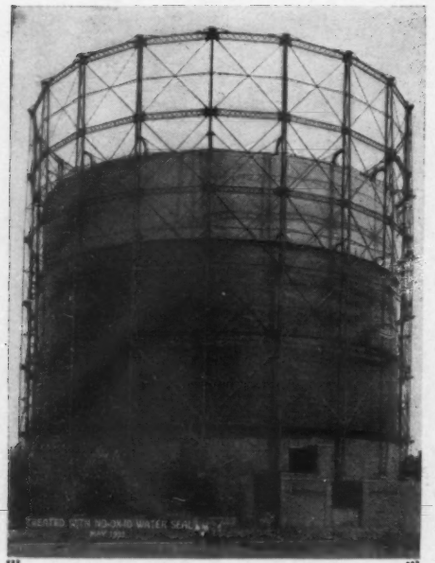
A strong, dependable connection, yet economical to use. For broken lines of either plain end or threaded pipe; also used on screw and welded lines at intervals to take care of expansion and contraction. Diameters 5⅝ to 24 inches; lengths 16 to 48 inches.

No. 1 COUPLING

A most efficient expansion joint for connecting house service lines. Easily and rapidly applied, yet permanently tight and leak-proof. Made in two styles, plain and with boss on side which may be tapped for any size of side opening desired. Sizes from ½ to 2 inches.



THE NATIONAL-SUPERIOR CO.
DAYTON PIPE COUPLING DIV.
DAYTON, OHIO



Is There Any Stronger Proof?

This and other holders of the gas company in one of our largest cities were in such excellent shape at a recent inspection, the company at once ordered NO-OX-ID WATER SEAL for two additional holders. Is there any stronger proof of merit?

DEARBORN CHEMICAL COMPANY
Los Angeles: 807 Mateo Street, Phone TRinity 3385
San Francisco: 421 Bryant St., Phone SUtter 8688

NO-OX-ID
IRON RUST
The Original Rust Preventive

NEW *Sales Literature*

Now Available!

Pacific
GAS HEATING HEADQUARTERS

Our Line for 1934!

- FLOOR FURNACES
- CABINET HEATERS
- WALL HEATERS
- GAS STEAM RADIATORS
- RADIANT HEATERS
- WATER HEATERS
- GRAVITY FURNACES
- FORCED AIR FURNACES
- UNIT HEATERS

The Outstanding Gas Appliance Line of the Pacific Coast. Write for complete information on any or all items . . .

Pacific Gas Radiator Co.
Main Office and Factory
Huntington Park, California
Oldest and Largest Manufacturer of Gas Heating Appliances in the West

floods the surface of the revolving pipe and the excess flows down into the tank. The revolving of the pipe allows the enamel, in cooling, to distribute itself evenly on the pipe surface.

The enameled pipe then enters the header where the cement mortar is distributed evenly around the surface and the pipe is spirally wrapped at the same time with a heavy cotton cloth applied under tension. High frequency vibrators are located at several points on the header, to effect a continuous flow of cement mortar and also settle the voids.

After the coated and shielded pipe emerges from the machine the joints are parted. Excess material is removed at each end to provide for subsequent field connections and the cloth wrapper is taped at each end.

Felt wrapping, if desired, is applied by substituting for the header, suitable reel holders and other equipment. A single or double wrapper con be applied, either bonded or unbonded. Enamel can be applied over the felt followed by Kraft paper.

In the field, the cement-wrapped pipe will be connected by welding or mechanical couplings. After this work is completed, the exposed steel at the joints will be coated with a suitable bitumastic material; then cement mortar will be applied over these coated joints with a trowel or light steel metal form to a thickness of at least twice that of the cement armor.

Distribution Systems Completed For Minnesota Utility

Construction of the Minnesota Valley Natural Gas Co.'s distribution systems in the towns of Le Seur, New Prague, Montgomery and Le Center, Minn., are now complete and natural gas service has begun. The company headquarters in St. Peter, Minn., where service began late in September.

Domestic and Gas Engine Exhibits at L. A. County Fair

APPROXIMATELY 400,000 persons viewed the display of modern gas appliances at the 1934 Los Angeles County Fair, held this year from September 15 to 30, inclusive, at Pomona. The display was the most unusual ever presented by the Natural Gas Bureau, which represents the Los Angeles Gas and Electric Corp., Southern California Gas Co., and Southern Counties Gas Co.

An entire section of the exhibit hall with a total floor space of 20 by 70 feet housed the display. Featured were modern gas ranges, water heaters, refrigerators, furnaces, radiators and other heating devices. Four attractive hostesses greeted the thousands of visitors.

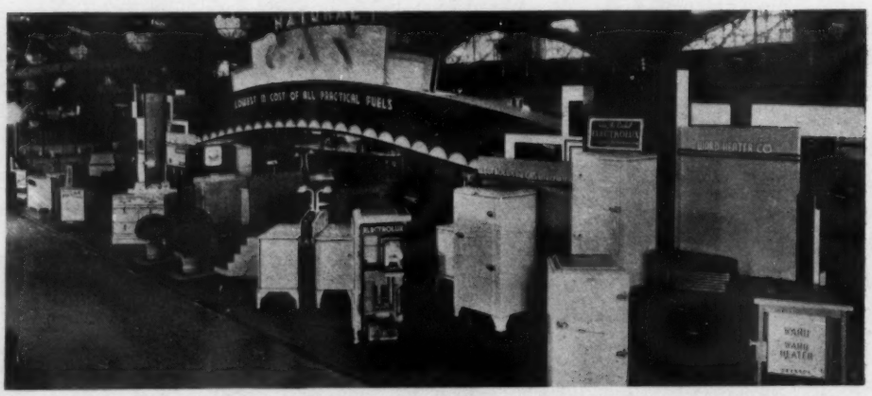
The background for these displays consisted of a beautifully colored modernistic arch running through the center of the display 70 feet long and 14 feet high at the center. The color combination included orange, black and gold. Flood lights from each of the four corners of the exhibit illumed the entire display, assisted by indirect lighting along the top of the center arch.

Comfortable chairs in the center court were provided for Fair visitors who desired to rest a bit amid the attractive surroundings. Courteous attendants were on duty at this unusual display of modern gas appliances to answer questions and to assist visitors in every possible way.

In addition to the display of domestic appliances, there was held again this year a complete gas engine exhibit participated in by 17 exhibitors. There were 21 engines totaling 1,640 connected horsepower, all in operation, most of them pumping water. This display was conducted as a cooperative arrangement between the Natural Gas Bureau and the participating manufacturers.

Chas. L. Ferry, industrial engineer for Southern Counties Gas Co., busied himself with a pencil at the engine display, and estimated that engines operating there, working on a 100-foot water lift, could pump 50,000 gallons per minute, equivalent to 416,666 pounds of water per minute, sufficient for a city of 450,000. In terms of irrigation this amount of water would irrigate 8,000 acres of alfalfa or 40,000 acres of citrus trees.

Value of the engine equipment demonstrated at the Fair was over $75,000. Many types of engine drives were exhibited, including horizontal and quarter turn V-belts, right angle drive and direct connected horizontal gear pump drive.



One view of the natural gas exhibit, featuring domestic appliances, at the 1934 Los Angeles County Fair.

Servel, Inc. Executive Changes Made; Sales Subsidiaries Absorbed

F. E. SELLMAN was elected vice-president of Servel, Inc., manufacturers of Electrolux refrigerators, at a meeting of the board of directors on November 22. Mr. Sellman was formerly vice-president of two subsidiaries of Servel, Inc., namely, Servel Sales, Inc., and Electrolux Refrigerator Sales, Inc., which have been merged into the parent organization as sales divisions.

Mr. Sellman will act as vice-president in charge of distribution which will include sales advertising and sales promotion activities in the marketing of Electrolux gas and kerosene-operated refrigerators.

The newly-elected vice-president of Servel, Inc., was graduated from the Stevens Institute of Technology in 1908 after which he was with the Pennsylvania Railroad for 18 years during which time he was promoted step by step until he became master mechanic of the Cleveland and Pittsburgh Railroad, a division of the Pennsylvania system.

In 1926, Mr. Sellman went with Servel, Inc., as a consultant engineer, later to be placed in charge of sales, followed by promotion to the vice-presidency of the sales subsidiaries of the organization.

North I. Townsend, of Evansville, Indiana, formerly comptroller of Servel, Inc., has been made secretary and treasurer of the company. Mr. Townsend's business career includes extensive banking experience; service with the Great Lakes Engineering Works, shipbuilders in Detroit, for whom he handled cost, time keeping and stock work; a period as head bookkeeper and assistant chief clerk for the Detroit Edison Co. and subsidiaries; 12 years with the firm of Ernst & Ernst, nationally known accountants. In 1930 he went with Servel, Inc., as comptroller. He makes his headquarters in Evansville, Indiana, where the Servel, Inc., factory is located.

Johns-Manville Forms Credit Subsidiary to Finance Repairs

Johns-Manville has announced that its recently formed subsidiary, the Johns-Manville Credit Corp., through cooperation of the Federal government, is now able to finance industrial and commercial repair and modernization work at a financing cost of $5 per $100 per annum, the same as specified in the National Housing Act.

The new corporation is capitalized at $1,000,000. No down payment is required under the arrangement and amounts up to $2,000 may be obtained for each building involved. Payments are made in monthly installments over a period of from one to three years.

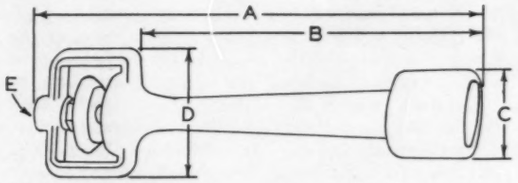
Among the improvements being made or planned under the J-M credit plan are new roofs or repairs to present ones; insulation of boilers, piping and other heated or refrigerated equipment; new siding and industrial floors.

Distribution Engineer Available

A chemist and engineer, connected for the past nine years with an Illinois utility as distribution engineer, and highly recommended by his former employer, is looking for a new location. Further information will be given upon application to *Western gas.*

Illustrated above is N.G.E. Type 16 Burner

N.G.E. Types 14-15-16 Burner Specifications



Dimensions and Weights for Types 14-15-16						
Type	Overall Length A	Length B	Width C	Height D	Gas Connection Pipe Size E	Shipping Weight
14	18″	13½″	3½″	5½″	½″	8 lbs.
15	20″	15½″	4½″	5½″	1″	20 lbs.
16	24″	17″	5″	5½″	1″	23 lbs.

The Solution for Many Problems of the Industrial Gas Engineer

The new type N.G.E. burners, embodying modifications of the Venturi meter tube, operate on the principle of entraining the major part of the air required for combustion, by the pressure energy of the gas issuing from an orifice into the Venturi throat of the burner.

These burners are ideal for a wide variety of installations: for kilns, dippers, small boilers, direct fired bake ovens, stills, furnaces, incinerators, etc.

Meeting an ever increasing demand for moderately priced Venturi type burners, they will give satisfactory and efficient service at minimum cost.

Types 14-15-16 Burners are identical in design and construction, differing only in size for varying capacities. They permit efficient utilization of the Venturi principle, having excellent flame retention qualities and very low turn-down characteristics. Efficient operation is obtained over a gas pressure range of from 4 oz. to 5 lbs. Write for literature.

Illustrated above is N.G.E. Type 14 Burner

NATURAL GAS EQUIPMENT INC.

Petroleum Securities Bldg. Los Angeles — **1123 Harrison St.** San Francisco — **Arizona distributors** Crane Co.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

IMPROVED!

JOHNSON "Heatflo" CONVERSION BURNER

The original Johnson Conversion Burner was efficient and dependable. But the improved model, the Johnson "Heatflo", sets new records for beauty, efficiency and economy. Streamline design, quiet operation, maximum efficiency, proved economy, and lowered prices . . . . these features insure public acceptance. Write for new folder.

Johnson Gas Appliance Co.
Cedar Rapids, Iowa

WESTERN REPRESENTATIVE—
C. B. Babcock Co.,
135 Bluxome St.,
San Francisco, Calif.

EASTERN REPRESENTATIVE
C. E. Barba,
3111 West Allegheny Ave.,
Philadelphia, Pa.

Get on the "Better Housing" Band Wagon!

(Continued from Page 15)

November *Western Gas* commented at length on several gas company procedures for cooperating with the F.H.A. While it is still somewhat early to report tangible results from such work, facts are available from a few areas. In San Francisco, where the Pacific Gas and Electric Co. inaugurated one of the very first tie-in movements, indications are that gas appliances and equipment are figuring heavily in the applications for loans being made by home owners to the Federal Housing Administration. According to the San Francisco Committee of Promotion for the F.H.A., the first 13 working days of the drive in the City and County of San Francisco brought out a total of 12,770 applications for loans to cover reconstruction and new equipment. Of this total, 1,285 were plumbing and/or heating jobs. While no further breakdown of this figure is available to show what specific type of installation is being made, it can be assumed safely that gas heating installation or remodeling is a prominent factor.

The promotion of gas appliance sales in connection with this campaign has been considerably aided in the territory of the Pacific Gas and Electric Co. by the utility's offer to pay one-third of the advertising expenses incurred by retail dealers in publicizing the drive.

Tie-In Loan Plan

In last month's issue one of the company plans commented upon was that of the Brooklyn Union Gas Co. Since the earlier report this company has introduced additional refinements into its Better Housing procedure which are worth noting. According to Hugh H. Cuthrell, manager of the company's new business department, the company's Kitchen Planning Division has been redressed as a Home Modernizing Division, and is now prepared to assist customers in remodeling their kitchens and basements. Brooklyn Union has also developed a loan plan for the benefit of dealers on its system, in conjunction with Better Housing loans. Here is how it works:

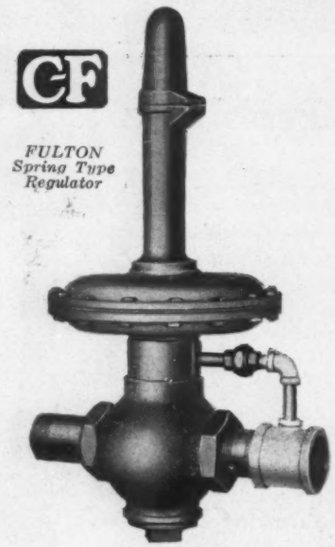
In cases where contracts made by plumber-dealers include gas burning appliances, such as ranges, refrigerators and water heaters, all that is required of a dealer is that he have his customer fill out Property Owner's Credit Statement, form FHE-3, furnished by the Federal Housing Administration, and bring it to the gas company's branch office. In cases where both husband and wife are employed, each should fill out a separate form. The dealer presenting these credit statements will furnish a statement on his own letterhead to the effect that customer has exhibited deed to his property, together with the latest tax and assessment receipt and the date of payment.

On receipt by the gas company of the Property Owner's Credit Statement and the dealer's letter acknowledging that he has seen the deed to the property together with the latest tax and assessment receipt information, the credit department will check credit of applicant's gas account and also appliance account, if any, and transmit full information to the bank. If the credit is approved the bank will write the customer including a promissory note, a signature card and a letter containing the customer's instructions for the proceeds of the loan. The bank will inform the customer that if he will sign and return these documents to the bank, it will endeavor to grant him the loan immediately.

The loan is to be paid by two cashier's checks, one to The Brooklyn Union Gas Co. for the full retail connected price of the gas appliances and the balance to the plumber dealer where other work has been performed. Dealers are cautioned, in making quotations including gas appliances, to itemize their bids, using the gas company's retail connected selling prices. When the gas company receives payment from the bank it proceeds in its regular manner to give dealers the full cash discount on the appliances specified in the loan, plus the connect charge.

If there are gas company new business departments or manufacturers not already enlisted in the Better Housing drive they will benefit by getting in line without more delay. The more tangible the plan worked out for cooperation, the more tangible will be the business returns realized.

MEDDLER-PROOF



FULTON Spring Type Regulator

LIGHT, compact, and easily transported, yet sturdy, dependable, and durable in hard use, the Fulton Spring Type Regulator is recommended for exposed and remote locations. It is self protecting to an uncommon degree—less subject to accidental disturbance or even intentional meddling than a lever-type regulator—and is very simply designed for quick connection. The high-pressure type will take any inlet pressure up to 300 pounds and reduce to a constant pressure anywhere between 10 and 50 pounds, as desired. Low pressure type is adapted for inlet pressures up to 50 pounds and will reduce to desired pressure not exceeding one pound. Full information on this and other C-F regulators for all requirements of gas control will be mailed on request.

The Chaplin-Fulton Mfg. Company
28-40 Penn Avenue Pittsburgh, Pa.

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Sales and Service
Dallas — Tulsa

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OR ANY JOBBER

GENERAL CERAMICS COMPANY
REFRACTORIES

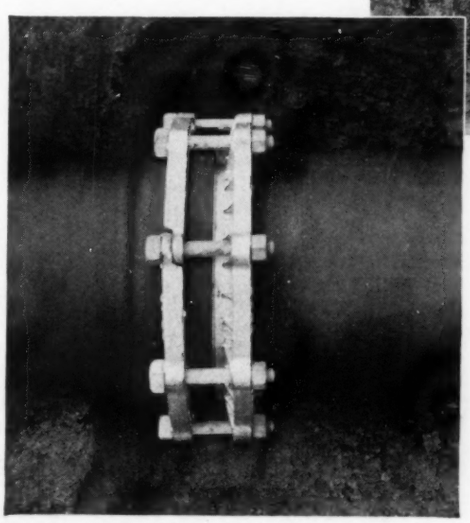
General Ceramics Refractories are made to exacting standards of accuracy and uniformity. That is why they are being used by the leading manufacturers of conversion burners, space heaters, and circulating heaters. Our engineers will gladly cooperate on new designs, alterations, production economies, etc.

General Ceramics Company, 71 West 35th Street, New York

CAST IRON PIPE
with gas-tight mechanical joints

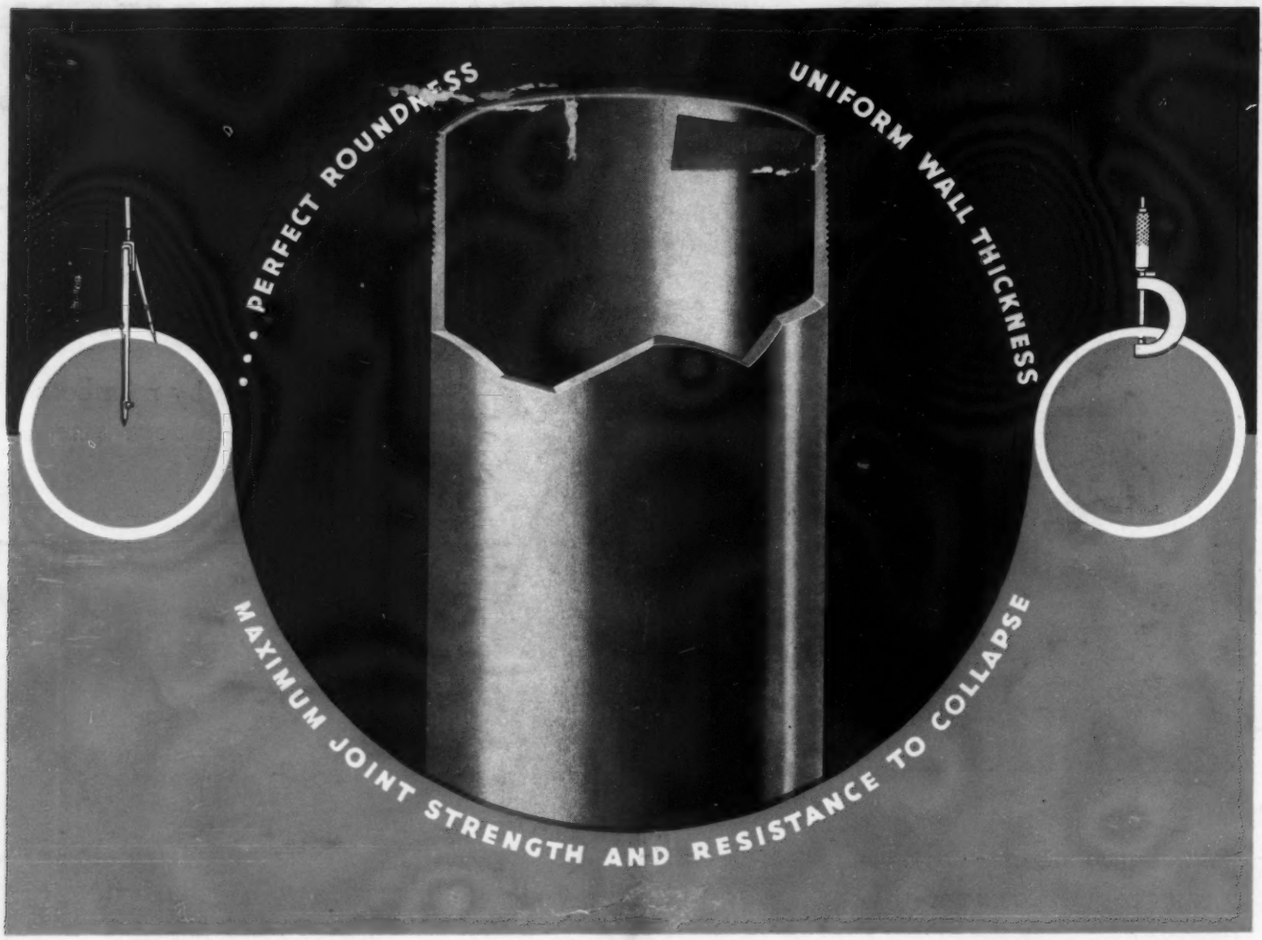
The several mechanical joints made by members of this Association differ in design but are based on the same principle.

All these joints have rubber gaskets and follower rings. All are rendering gas-tight service under high pressures.



Note the ease and simplicity of installation. No skilled labor. The only tool a ratchet wrench.

THE CAST IRON PIPE RESEARCH ASSOCIATION
Thomas F. Wolfe, Research Engineer
309 Peoples Gas Building, Chicago, Ill.



Casing collapse, and joint failure in both casing and tubing, cost the oil industry huge sums of money annually. To cut down the loss, Republic offers a better casing and tubing—Republic Electric Weld—made by a process that insures maximum joint strength and increased resistance to collapse.

Aside from the physical properties of the metal itself, the two most important factors in reducing failures in casing and tubing are roundness and uniform wall thickness—both serving to increase resistance to collapse and insuring a uniform amount of metal under the root of every thread.

Republic Electric Weld Casing and Tubing are made from flat-rolled steel, uniform in section and grain structure. This flat steel is cold-formed to shape and then welded by Republic's modern process employing electrical resistance. By no other commercial method can casing and tubing be produced so nearly perfectly round and so uniform in wall thickness.

Republic Electric Weld Casing and Tubing are as dependable as skilled metallurgists and advanced mill practice can make them. Try them in your next well. The reports from your men in the field, during and after installation, will confirm your judgement.

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CASING • TUBING

REPUBLIC STEEL CORPORATION

GENERAL OFFICES — YOUNGSTOWN, OHIO

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